

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

2 H D 1755
A 376

/

Agricultural Outlook Forum '97

Speech Booklet 2

Session, Title and Speaker

Coping With Future Changes

What's Ahead for Agriculture?

Michael Martin, Dean, College of Agricultural, Food, and Environmental Sciences,
University of Minnesota

Market Stability and World Food Security

Food Needs for the 21st Century

Alex F. McCalla, Director, Agriculture and Natural Resources Department, World
Bank

The Role of Research in the Outlook for World Food

Per Pinstrup-Anderson, Director General, and Rajul Pandya-Lorch, Special Assistant,
International Food Policy Research Institute

USDA's Domestic and International Agricultural Projections to 2005

International Baseline Projections To 2005

Maurice R. Landes, International Projections Coordinator, Economic Research Service,
USDA

Dairy Forum

Outlook for Dairy: 1997 and Beyond

James J. Miller, Economic Research Service, USDA

Tobacco Forum

U.S. Tobacco Outlook

Tom Capehart, Agricultural Economist, Economic Research Service, USDA

The Foreign Tobacco Outlook

Peter W. Burr, Foreign Agricultural Service, USDA

Livestock and Poultry Forum

Livestock and Poultry Outlook

James E. Nix, Livestock Analyst, World Agricultural Outlook Board, USDA

WHAT'S AHEAD FOR AGRICULTURE?

Michael V. Martin, Dean
College of Agricultural, Food,
and Environmental Sciences
University of Minnesota

Thank you for the invitation to participate in this very important conference. My comments are offered from the perspective of a midwest land-grant university dean whose professional background is economics. The point is, I may not have fully representative views, but I will share them nonetheless.

Over the next decade, a number of complex forces, many yet unknown, will shape and continually re-shape American agriculture. I'll focus on six that are of particular relevance to those of us in land-grant universities.

1. Structural Change - We are witnessing dramatic structural change at the farm level, particularly in livestock agriculture. The poultry industry, of course, went through a period of consolidation some time ago. The swine and dairy industries are now experiencing similar change.

In the midwest, we've seen the number of farms decline while the number of animals has remained constant or increased.

This consolidation and restructuring is engendering a spirited debate over family vs. factory farming. There are many who believe that the emergence of large scale livestock operations, while understandably based on economic considerations, may have significant social and environmental impacts. The controversy over siting or expansion of large animal units is creating conflict within and between rural communities. In Minnesota we have two counties which have banned expansion of livestock farms. The legality of these bans is still in question.

The environmental concerns are, at least theoretically, measurable and ultimately, solvable. The social considerations are much less specific and accent the intense differences in values. As a consequence, no obvious solutions are available.

Consolidation in livestock production has also highlighted differences, or presumed differences, in state level environmental regulations. Shifts in production between states are often attributed to differences in environmental regulation. For example, leaders of Minnesota's swine industry are convinced that North Carolina's emergence as a major swine producer is primarily the result of over regulation at home and/or under-regulation in North Carolina.

And, land-grant universities are caught in this controversy as well. If we conduct research aimed at mitigating the negative environmental effects of large-scale livestock units, we are accused of advocating consolidations. If we ignore these issues, we are accused of abandoning commercial agriculture and significant social concerns. It's a tricky situation indeed.

Dramatic structural change is also occurring in critical parts of the agricultural input sector. Of particular importance is the rapid consolidation, even oligopolization in private sector agricultural biotechnology development.

A few large firms have acquired or are acquiring ownership of core biotechnology. While they may bring substantial economies of scale to research and development, they may also conduct business in a profit-maximizing but, some might argue, a socially unacceptable manner.

The ability to own and control powerful, living technologies offers great promise but also prompts great concern. Ensuring that the public interest is protected is a serious public policy matter.

Which leads me to a second force shaping the future of American agriculture.

2. Emergence of Biotechnology - The biotechnology revolution is only just beginning. Still, it holds the promise for enormous change in agricultural production and productivity. Traditional crop breeding and animal improvement programs are giving way to genetic manipulation and engineering. Plant and animal disease control, new product development and environmental protection may be altered substantially through the applications of biotechnologies.

Biotechnology is changing public-private research relationships. The extremely high cost of biotechnology research will lead to two or maybe three levels of land-grant university status: (a) those who have the means and can realize the benefits of this research, (b) those in an ancillary role to the first tier research institutions, and (c) those left behind.

The public institutions which remain central players in biotechnology research will do so because they have struck appropriate and functional partnerships with private sector firms. They will be legally complex, scientifically interrelated and politically hazardous.

Applications of biotechnology could exacerbate problems of international inequality and conflict. Recent decisions by the European Community to block imports of biotechnology enhanced agricultural products may be a harbinger of things to come. Differences over biotechnology may become another form of non-tariff trade barrier. Nations that control biotechnology may dominate those who do not. There is no certainty that biotech will not lead to further global inequities.

And, as already suggested, biotechnology is accompanied by a very complex and controversial set of ethical, legal and environmental questions.

3. System Sustainability - The terms "sustainable" and "sustainability" carry considerable baggage in some circles. Still, it is clear that we must develop technologies, management approaches, strategies and policies which will allow for the intergenerational transfer of an economically viable, socially stable, environmentally sound and highly productive agricultural system. Moreover, this broad definition of "sustainable" must be applied across a complex agricultural input, production, processing and distribution system.

Pursuit of a systems approach to sustainability will require continuous change, innovation and adaptation across all activities and functions of food, fiber and energy production.

4. Rural Infrastructure Constraints - Among the major constraints to continued growth and development of American agriculture is a rural infrastructure, physical and institutional, under considerable strain. Rural roads, bridges and communication technologies will demand substantial investment if we are to remain competitive in global markets and enhance rural socio-economic viability.

Needs for physical infrastructure are fairly easy to identify and quantify. Though they are very expensive, needs for social or institutional infrastructure are much less obvious but no less important. Farmers and other rural citizens require access to education, health care, information and social services. For all the well known reasons, provision of these is a major fiscal and logistical challenge.

5. A Shortage of Human Capital - As agriculture, broadly defined, moves through substantial change and transformation, perhaps the single most binding constraint to genuine progress will be a shortage of well educated, adaptable management. A complex set of social and demographic factors have given rise to a very steep decline in the number of young people entering the work force with "farm backgrounds." In our case at the University of Minnesota, less than 25 per cent of the students entering the College of Agricultural, Food, and Environmental Sciences are from farms. Very few intend to return to production agriculture. Many seek opportunities only peripherally related to agriculture.

Over the past five decades, agriculture has released an enormous management and work force to other sectors and industries. We may now have reached a point where some reverse flow must occur.

We understand the complex challenges associated with remaining globally competitive, environmentally sound and technologically advanced in agriculture. We will need managers across all functions of the agricultural and food system who

can meet these challenges. Failure to supply a cadre of well-trained, creative and adaptable managers will do serious harm to this essential sector.

6. The Urgent Need for a National Agricultural Research Policy - American agriculture has benefited from a long-term commitment to research and technology transfer. A system which dates back to 1862 has performed admirably.

But, we are at a turning point in U.S. agricultural research. There is a pressing need for a new comprehensive agricultural research and technology transfer policy. Land-grant universities, Agricultural Research Service and other research institutions are competing for the declining pool of public funding. Agendas of the U.S. Department of Agriculture, the National Science Foundation, The National Institutes of Health and other research funders are uncoordinated and lack common themes and objectives.

As the private sector sponsors a larger share of university food and agricultural research, public and proprietary interests become intertwined. Increasingly, private funders are leveraging public funds for primarily private benefits. This represents an inversion of the traditional relationship.

We have reached the point where a comprehensive agricultural, food safety and nutritional, environmental and international research policy must be developed. It must set out a larger research framework and identify resource needs.

Recent legislative initiatives have focused on increased oversight and accountability but have focused little attention on the broader directions and goals the larger research. I fear we are being held more accountable for less meaningful outcomes.

Summary and Conclusion

We know that agriculture is now adjusting to a new policy regime, the 1995 Farm Bill and the accelerating globalization under NAFTA, GATT and other agreements. Over the next few years, we will see the consequences of policy deregulation. At the same time, pressure from environmental interests, animal rights groups, preservationists and others will force changes in management at the farm level and elsewhere.

In the longer term technology development, transfer and adoption and other more fundamental investments, will be a central force re-shaping the complex agricultural sector. The ways it will be re-shaped cannot now be determined. But, real change is occurring and will continue.

FOOD NEEDS FOR THE 21ST CENTURY¹

by Alex F. McCalla²

Director, Agriculture and Natural Resources Department
The World Bank

I. Introduction

I would like to redefine the topic assigned me as the challenge of providing food security for all in the 21st century. Food needs suggests to me, at least, the simple arithmetic of multiplying population by basic nutritional needs. Food security for the 21st century is much more complex and therefore much more difficult to predict. It is about more than adequate supplies. It is also about reducing undernutrition and enhancing development.

Food security means to me that every individual has access to enough food to maintain a healthy and active life. Ensuring food security for all is a challenge with many dimensions. These are outlined in Matrix 1. There are issues of food security at the household, national and international levels and the focus of policy intervention clearly changes as the time frame lengthens. In the short term, reducing hunger clearly must focus at the household level with enabling actions by nations. Globally there is little to do except provide emergency food aid if it is available. As the time frame lengthens, economic and social development at the national level to increase access of the poor households to food becomes paramount. The international role is to support that development, provide support for international agricultural research and provide a fair trading system. An effective and fair international market those nations who are better at other things than growing food assurance that global markets will be open to them. In the long term productivity enhancement, adequate global supplies and a well functioning trading system are critical.

Thus, it is clear that food security is much more complicated than projecting adequate global supplies for the next thirty years. Understanding the challenge begins on the demand side. Most projections of population suggest a global population of around 8 billion people in 2025, an increase of about 2-1/2 billion people from the 1990's. Population is one of the two drivers of aggregate food demand, income is the other. With modest income growth, food needs in developing countries could almost double in the next 30 years. The composition of aggregate

¹ Statement prepared for Agricultural Outlook Forum '97, Washington, D.C., February 24, 1997

² The views expressed are those of the author and do not necessarily represent the views of the World Bank.

Matrix 1 The dimensions of food security: Critical variables

	short-term (1-3 years)	medium-term (5-15 years)	long-term (25-30 years)
Household	Access to Food Nutrition And Health	Access to Income or means to produce food	Poverty eliminated Social infrastructure
National	Safety Nets Nutrition and health	Economic Development Sustainable Production Systems Agricultural Research	Rural and economic development Sustainable Production systems Agricultural Research
Global	Grain Stocks Food Aid	INTERNATIONAL RESEARCH FAIR TRADING SYSTEM Sustainable Global Supplies	INTERNATIONAL RESEARCH FAIR TRADING SYSTEM Sustainable Global Supplies

demand also changes with rising income levels and with where people live. Most of the growth in population over the next 30 years will occur in developing countries. Further in this same period, urban population in developing countries will increase by a number equivalent to global growth (2-1/2 billion). With rising incomes and urbanization, the composition and characteristics of food demand will be significantly altered. More of the food supply will have to be processed, transported and stored. In parallel, the share of the developing country dwellers who can depend on subsistence agricultural production will decline sharply. The implications of this are that a much larger share of food production will enter markets both within and between countries.

These developments on the demand side clearly raise challenges for the global food production system. The fundamental questions are: can the world produce enough food to feed 8 billion and at the same time hopefully reduce the number of undernourished below the current level of 800 million? If so, where will it be produced? Will we break away from the mental mind set of equating food security with national food self-sufficiency and ask where the food should be produced? And finally, does the world have a trading system that will allow increasing quantities of food to flow from surplus to deficit areas?

It is to these questions that the rest of the paper is addressed. I use the three aspects of food security - availability, access and effective utilization (nutrition) - as the framework for my discussion. I will look at four time frames - retrospective (1961-1990), recent past (1990's), and the current situation and the future both medium (2010-2015) and longer term (2020-2025). A summary of the case I shall make is presented in Matrix 2.

II. Performance to Date

1. Retrospective (1960s-1990)

a. Availability

Despite periodic predictions of imminent shortages (1965-66, 1972-74, 1988) the world did remarkably well in expanding food production over the 30 year period 1960-1990. World cereal production more than doubled, per capita food production increased 37%, calories supplied increased 35% and real food prices fell by almost 50%. Regionally average calories available per day increased significantly in the Near East and North Africa, East Asia and Latin America to levels of 2700 calories per day or higher. South Asia grew more slowly and still is a region with significant undernutrition. But Sub-Saharan Africa experienced a decline in per capita food availability. The increases in production came from three sources - biological yield increases, land use intensification (irrigated acreage in developing countries doubled) and expanded area.

b. Access

Yet despite an overall effective global performance, under nutrition remained a serious problem. In 1969-71, 920 million people were undernourished which represented 35% of

Matrix 2 - Elements of Food Security (cont)

Time Frame	Availability	Access	Utilization
Future: Medium term 2010-2015	<p>Most projections suggest adequate global supplies but some are concerned about resource constraints</p> <p>Differences between optimists and pessimists, focus on yield potential, land expansion/loss and water availability</p>	<p>World Food Summit target of 400 million undernourished by 2015</p> <p>FAO projects 680 million in 2010</p>	<p>Forecast difficult, will be conditioned by success in poverty reduction and improved nutrition delivery systems</p>
	<p>Food needs in developing countries could nearly double</p> <p>Challenge is serious and will be impossible without appropriate policies and continued expanded investment in research for the development of new technology</p>	<p>Goal: to eliminate under nutrition</p> <p>This would increase projected food demand by 10%</p>	
Longer Term 2020-2025			

developing country population. By 1990-1992, the FAO estimate was 840 million undernourished people, now 20% of developing country population. In relative terms there was progress though regional performance varied widely. In 1969-71, 76% of the undernourished lived in Asia (51% in East Asia) and 11% in Sub-Saharan Africa. In 1990-1992, 60% lived in Asia (30% in East Asia) and 25% lived in SSA. But in absolute terms the number diminished very little.

c. Utilization

Though firm data is unavailable it is likely that over 1 billion people suffered from a deficiency in one or more micronutrients (e.g. Vitamin A, iron, iodine, zinc & copper) in the 1960's. In the early 1990's, estimates are that 1.6 billion people are at risk of iodine deficiency and about 2 billion people are affected by iron deficiency (FAO 1996, Paper 5, pp. 6-7).

In sum, improved performance on the supply side, relative but not absolute improvements in reducing undernutrition and an apparent increase in the incidence of micronutrient deficiencies. Therefore, argue many, supply was not a constraint.

2. The Recent Past to the Present (1994-1996)

a. Availability

World grain prices experienced "a spike" in 1994-1996 with wheat, corn and rice prices increasing by 70-100% by April 1996. Since then prices of wheat have returned to 1994 levels. As prices escalated and the stock to use ratio plummeted to its historical low (13.2%) concerns about whether this was the beginning of the period when demand finally outruns supply or simply a short-term perturbation, broke out. Those arguing the case for a prolonged period of shortages and rising prices cited declining growth rates on yields in the 1990s, losses of land from production and water and environmental constraints as powerful indicators for the future. Others argued it was the market overreacting to a bad U.S. crop in 1995 and policy changes in the EU and the USA which lowered farmers prices and reduced stocks. They argued production would expand in 1996 and prices would fall back and continue the long-term trend of declining real grain prices.

A more careful analysis of the events of the last two years suggest a more complex set of causes (Ingco, Mitchell and McCalla). Starting with the 1991 European Union (EU) Common Agricultural Policy (CAP) reform, followed by US policy changes in 1995 and continuing adjustments to lower prices in Australia and Canada caused harvested grain areas to decline and stocks to decrease significantly. Between 1981 and 1995 harvested area in the five largest exporters - U.S.A, EU, Canada, Australia and Argentina contracted by 34.5 million hectares accounting for 53% in the global decline in grain area harvested of 65.3 million hectares. Another 41% of the decline is accounted for by reduced grain area in the Former Soviet Union (FSU). This contraction represented an almost 10% reduction in global harvested area. The resulting

decline in output, coupled with policy changes which reduced public stock holding, contracted exporter stocks from 262 million metric tons to 58 million tons (88 percent of the decline in world stocks) and global stocks by 233 million tons, a more than 50% reduction. These trends coupled with lower 1995 production triggered a sharp run up in prices between May of 1995 and April of 1996. A 15% increase in production in these vie exporting countries and a 7-1/2% increase globally in 1986 caused wheat and corn prices to drop sharply to pre 1994 levels by early 1997. Rice prices remain however at close to peak levels. It will clearly take more time for stocks to rebuild. Thus for the moment those arguing that this was a spike, not a change in long-term trends, seemed to win the shortrun argument at least for wheat and corn. But what of the future?

III. The Future

Views of the challenge of food security for all diverge more strongly as the time frame is lengthened. Those using economic projection or simulation models, based significantly on history, tend to project sufficient global supplies at least until 2010. Those projecting on the basis of resource availability and environmental constraints (perhaps these could be called ecological models) all are generally much more pessimistic. The most extreme view combines resource constraints with biological pessimism and foresee serious problems ahead (Brown and Kane). Picking ones way through this mine field is fraught with difficulty and occasional danger. The very nature of projections using compounding growth rates of population and income compared to yield growth rates means that food gaps grow rapidly if the growth rate of demand exceeds supply. In the opposite case, if supply growth rates augmented by land expansion exceed demand growth, real food prices decline (the scenario of most of the last 100 years). Therefore, we look first at the medium term (10-15 years ahead) before turning to the more problematical longer term (20-25 years). Much of the analysis that follows comes from a recent Bank publication (Ingco, Mitchel and McCalla).

1. Medium Term (2010-2015)

a. Availability

Several recent simulation studies have projected global cereal or food balances to 2005, 2010 or 2015. Three studies done at IFPRI, FAO and the World Bank make projections to 2010 and come to similar conclusions (Agcaoili and Rosegrant, 1995; Alexandratos, 1995; and Mitchell and Ingco, 1993). All three studies project grain yields to increase 1.5-1.7% per year, area harvested is expected to increase modestly, global grain demand is projected to grow more slowly and trade in grains is expected to increase. All three studies expect real grain prices to remain constant or decline. Regional food problems are expected to persist in South Asia and especially Sub-Saharan Africa.

In reporting on a conference at IFPRI which reviewed the three projections to 2010, Islam (1995) concluded:

Matrix 2 - Elements of Food Security

Time Frame	Availability	Access	Utilization
Retrospective (1961-1990)	<p><u>Global</u></p> <ul style="list-style-type: none"> • World Cereal production doubled • Per capita food production increased 37% • Calories supplies increased 35% • real food prices fell by 50% <p><u>Regional difficulties</u></p> <p>Sub-Sahara Africa - per capita food supplies declined</p> <p>South Asia - slow growth</p>	<p><u>1969-71</u> 920 million people were under nourished. This was 35% of developing country population</p>	<p>Close to 1 billion suffered from deficiencies in one or more micronutrients</p>
Recent Past	<p><u>1994-1996</u> > 70% increase in grain prices</p> <p>1995 - harvested area down 10% almost all of it in 5 Major exporters and the FSU Stocks fell by 50%</p> <p>Stocks to use ratio fell to 13.2% lowest in history</p>	<p><u>1990-1992</u></p> <p>840 million under nourished, 20% of developing country population</p>	<p>1.6 billion at risk of iodine deficiency</p> <p>about 2 billion people affected by iron deficiency (FAO 1996)</p>
Current	<ul style="list-style-type: none"> • Prices have returned to pre 1994 levels • global production up 7% in 1996 • 5 Major exporters production up 15% in 1996 	<p>1996 -- 800 million under nourished</p>	

“There was general agreement the world food supply in 2010 would probably meet global demand but regional problems would occur. South Asia and Sub-Saharan Africa were recognized as the most vulnerable regions. The key to future food supplies was seen as increased productivity, that is, yields must continue to rise; to accomplish this, sustained support for investment in agriculture, including research expenditures, would be needed.”

A contrary view is presented by Brown and Kane (1994) who argue that there is little backlog of unused agricultural technology, that fish production has reached its biological limits and that rangeland carrying capacity has been exceeded. They further argue that the demand for water is pressing hydrological limits, that fertilizer responsiveness is declining and that much cropland (especially in China) is being lost to degradation, urbanization and industrialization. The resulting conclusion is very pessimistic with the only possible solution being greatly expanded trade which they see as problematic.

I will return to discuss these striking differences after we discuss the longer term scenarios.

b. Access

Access to food in the future very much depends on success in reducing poverty, especially in Rural areas, and a stimulating widely shared employment intensive growth. The recently concluded World Food Summit set as its target, reducing the number of undernourished to 400 million by 2015. FAO projects, based primarily on a continuation of past trends, that the number of undernourished would be 680 million in 2010.

c. Utilization

Success in reducing nutritional deficiencies of all sorts in the future depends both on improvement in overall nutritional status (access) but also with expanded nutritional education programs and improved nutrition delivery systems. What can be said with assurance is that overall economic growth will not eliminate nutritional issues.

2. The Longer Term (2020-2025)

a. Access

IFPRI (1995) also makes projections to 2020 which show a relatively good global food supply and demand balance in 2020. Real grain prices continue to fall (20% between 1990 and 2020) and real meat prices fall by 10 percent. Trade expands substantially, with imports by developing countries doubling. Food problems persist in Sub-Saharan Africa where imports are projected to triple, likely beyond the region's capacity to pay for them.

IFPRI also reports an alternative scenario where there is lower investment in agricultural research combined with slower income growth. This decline in public investment in agricultural research has severe consequences for the global food situation as it causes real prices to rise and malnutrition to increase. The IFPRI scenario highlights how sensitive long term projection models are to small changes in a particular parameters, in this case research investment.

How then can the economic modellers and the ecological pessimists reach such different conclusions? The reason is found in but four critical projection parameters (assuming they generally agree on the demand side) (McCalla, 1994). These are:

- 1) the rate of increase in biological yields over the next 30 years
- 2) the amount of land to be added or lost from agricultural production
- 3) the amount of land subject to intensification through irrigation
- 4) the impact of environmental degradation on food production capacity

Being relatively optimistic by projecting even a modest decline in past growth rates on the first three, produces the optimistic scenario given declining population growth rates. Projecting the apparent decline in yield increase in the 1990s (less than 1%) to 2025 plus land loss, no new irrigation and severe resource constraints can lead one to be very pessimistic.

But there are also several things both sides agree on - the need for continued investment in technology generating agricultural research and that farming systems cannot degrade the environment and must increase the efficiency of resource use.

In my judgment the optimists are too optimistic and the pessimists are too pessimistic. Reality suggests that feeding 2-1/2 billion more people well is an enormous challenge. Growth in agricultural output in the long term must come primarily from rising biological yields rather than from area expansion or intensification through irrigation. Why? Because most fertile land is under cultivation and the really suitable and low cost areas for irrigation have already been used. With population growth and urban expansion there will be rising competition for land and water from urban and industrial uses.

Doubling yields in complex farming systems without damaging the environment is an enormous challenge. The challenge is worldwide and both technological and political in nature. We require new technology to allow the development of new, high productivity, environmentally sustainable production systems. It is not more of the same with purchased inputs intensive monoculture. "The political challenge can only be met if international and domestic policies, institutional farm works, and public expenditure patterns are conducive to cost-effective and sustainable agricultural development". (World Bank, 1996)

b. Access

Two general comments under the access heading. First, if the world is successful in eradicating poverty and malnutrition we should both rejoice and redouble our efforts to intensify sustainable production systems. Why? Because eliminating malnutrition would bring 800 million people into the commercial market increasing demand by at least 10%.

The second point to be made is that all of the projections - both optimistic and pessimistic - foresee greatly expanded international trade particularly in grains. Developing countries in particular are expected to substantially increase their dependence on international markets. Further, rising incomes which cause expanded consumption of livestock products to increase demand for feed grains. In this future model, a non-distorted and freely working international market is critical both for exporters such as the U.S. and for importers whose domestic food security will increasingly depend on a reliable and relatively stable international market.

IV. Concluding Comments

Let me summarize my conclusions. Future global, national and household food security in the long run can be accomplished if we can develop sustainable production systems capable of nearly doubling output; if we have in place domestic and international policies and institutions which do not discriminate against agriculture and provide appropriate incentive to hundreds of millions of farmers around the world; if we continue to invest in public agricultural research such as through the Consultative Group on International Agricultural Research (CGIAR) and if we stay the course with removing distortion to freer agricultural trade in all countries.

These are four big “ifs” but they must be met. For without them the long term prospects are not very pleasant to contemplate.

REFERENCES

- Agcaoili, Mercedita, and Mark Rosegrant. 1995. "Global and Regional Food Supply, Demand, and Trade Prospects to 2010." In Nurul Islam, ed., *Population and Food in the Early Twenty-First Century: Meeting Future Food Demand of an Increasing Population*. Washington, D.C.: International Food Policy Research Institute.
- Alexandratos, Nikos, ed. 1995. *World Agriculture Towards 2010*. Rome: Food and Agriculture Organization.
- Brown, Lester R., and Hal Kane. 1994. *Full House: Reassessing the Earth's Population Carrying Capacity*. Washington, D.C.: Worldwatch Institute.
- FAO (Food and Agriculture Organization), 1996. *World Food Summit, Volume I, Technical Background documents*, 1-5, Rome.
- Ingco, Merlinda D., Donald O. Mitchell and Alex F. McCalla, 1996. *Global Food Supply Prospects*, World Bank Technical Paper No. 353. Washington, D.C.
- Islam, Nurul, ed. 1995. *Population and Food in the Early Twenty-First Century: Meeting Future Food Demand of an Increasing Population*. Washington, D.C.: International Food Policy Research Institute.
- McCalla, Alex F. 1994. "Agriculture and Food Needs to 2025: Why We should Be Concerned." Sir John Crawford Memorial Lecture, Consultative Group on International Agricultural Research, World Bank, Washington, D.C., October 27.
- Mitchell, Donald O., and Merlinda D. Ingco, 1993. "The World Food Outlook." World Bank, International Economics Department, Washington, D.C.
- World Bank, 1996. *Food Security for the World*. A Statement Prepared for the World Food Summit. Washington, D.C.

THE ROLE OF RESEARCH IN THE OUTLOOK FOR WORLD FOOD¹

Per Pinstrup-Andersen and Rajul Pandya-Lorch²

Modern science offers humankind a powerful instrument to assure food security for all without degrading the environment. Through enhanced knowledge and better technologies for food and agriculture, science has made major contributions to food security in recent decades. Food availability per person has increased by almost 20 percent since the early 1960s. There are 150 million fewer hungry people today than 25 years ago, and an additional 1.5 billion people in developing countries are being fed. The application of science through agricultural research has transformed food production in industrialized and developing countries. Higher yields and reduced risks have resulted in the production of more food at lower unit costs, higher farm incomes, and reduced food prices for the benefit of rural and urban poor people. Without effective use of science in agriculture, a large share of current forests would have been cut down and millions of hectares of land not well suited for agriculture would have been brought under cultivation with disastrous environmental effects.

In spite of past successes, hunger remains persistent at the threshold of the twenty-first century. Over 800 million people live in uncertainty of when or how they will get their next full meal, and 185 million preschool children suffer from seriously compromised mental and physical development because of malnutrition (FAO 1996). This situation is unconscionable, especially when resources are available to meet the food needs of each and every person in the world. Every man, woman, and child has the right to access to sufficient food to lead a healthy and productive life, whether that right is enshrined in official documents or not.

About 80 million people are expected to be added to the world's population every year for the next quarter century, increasing the world's population by about 35 percent to a total of 7.7 billion people by 2020 (UN 1996). With business as usual, global demand for cereals is projected to increase by 55 percent between 1990 and 2020 to 2.68 billion tons, for livestock products by 75 percent to 284 million tons, and for roots and tubers by 50 percent to 878 million tons (Rosegrant, Agcaoili-Sombilla, and Perez 1995). Developing countries, home to 98 percent of

¹ Prepared for USDA's Agricultural Outlook Forum '97 for the session on "Market Stability and World Food Security," Washington, D.C., February 24, 1997.

² Director General and Special Assistant, respectively, of the International Food Policy Research Institute (IFPRI), 1200 Seventeenth Street, N.W., Washington, D.C., 20036-3006, U.S.A.

the increased world population in the next 25 years, are projected to increase their demand for cereals by 80 percent to 1.5 billion tons, for livestock products by 140 percent to 156 million tons, and for roots and tubers by 64 percent to 631 million tons.

Meeting these increased food demands will require global cereal production to grow at an average annual rate of 1.5 percent between 1990 and 2020, livestock production at 1.9 percent, and production of roots and tubers at 1.4 percent (Rosegrant, Agcaoili-Sombilla, and Perez 1995). In developing countries, cereal production will need to increase at an average annual rate of 1.9 percent between 1990 and 2020, livestock production at 3.0 percent, and production of roots and tubers at 1.7 percent, in order to meet increased food demands. Yield increases will have to be the source of most of the production increases; significant expansion of cultivable land is not an economically or environmentally sound option in most of the world. Cereal yields will have to increase by at least an average annual rate of 1.5 percent in developing countries and of 1.2 percent in the world as a whole, otherwise farmers will be forced to encroach on land unsuitable for agriculture, with devastating effects on the natural resource base.

Existing technology and knowledge will not permit production of the food needed to assure a food-secure world in the years to come. There are no grounds to assume that yield increases can and will continue to grow at the same rates as in the past. Significant research investments are required simply to maintain current yields. If research support is not sufficient, yields can not only cease to grow but may decline. Low-income developing countries are grossly underinvesting in agricultural research compared with industrialized countries, even though agriculture accounts for a much larger share of developing countries' employment and incomes (IFPRI 1995). Their public-sector expenditures on agricultural research are typically less than 0.5 percent of the value of agricultural output, compared with 1-2 percent in higher-income developing countries and 2-5 percent in industrialized countries. Low-income developing countries must increase their national agricultural research expenditures in the near term to 1 percent of the value of agricultural output, with a longer term target of 2 percent. National and international agricultural research systems must be mobilized to develop improved agricultural technologies and knowledge, and extension systems must be strengthened to disseminate the improved technologies and techniques. Interactions between public-sector agricultural research systems, farmers, private-sector research enterprises, and non-governmental organizations must be strengthened to assure relevance of research and appropriate distribution of responsibilities.

Research has a key role to play in maintaining and raising yields in more-favored areas where significant yield gains have already been achieved. In these areas, conventional plant-breeding approaches are reaching their limits in raising the biological potential of plants to give

higher yields, while misuse and overuse of agricultural inputs such as fertilizer, pesticides, and irrigation technology are leading to degradation of natural resources and consequent losses in agricultural productivity. Already, rates of increases in yields of rice and wheat have begun to slow under both experimental conditions and on farmers' fields (CGIAR 1995). Accelerated agricultural research is required to develop plants with greater tolerance or resistance to adverse production factors such as pests and diseases; to develop biological alternatives to chemical fertilizers and pesticides; to improve the use and quality of agricultural inputs such as irrigation technology; to improve crop management techniques; and to rehabilitate areas that have been degraded and restore their productivity to the extent possible.

The balance between less-favored and more-favored areas must be redressed. Although more-favored areas will remain a key source of expanded food production in the future and, by minimizing the need to exploit new lands, will help to reduce pressures on the natural resource base, a continuation of past low priority on less-favored areas is inappropriate and insufficient to assure sustainable food security. Less-favored areas — areas with limited and unreliable rainfall and fragile soils — comprise much of the cultivable area in many developing countries, are home to many of the world's food-insecure and poor people, and are subject to considerable degradation resulting from poverty, population pressures, and lack of agricultural intensification. Yields are low and variable in the less-favored areas. In order to reduce risks and uncertainties for farmers, accelerated research is required to develop crop varieties that are more tolerant of droughts and better suited to fragile soils and more diverse ecological settings. Research is also needed to reduce soil erosion, to capture and utilize more moisture in the soils, to generate and recycle organic sources of plant nutrients, to develop more diverse cropping systems, and to better integrate livestock and trees into cropping systems (Hazell 1995). Much more attention must be directed to the development of appropriate technology for the less-favored areas.

Investment in agricultural research is an important factor in assuring food security. Projections to the year 2020 suggest that, under the most likely or baseline scenario, the number of malnourished children in the world could decline to 155 million from 185 million today (Rosegrant, Agcaoili-Sombilla, and Perez 1995). However, should investments in international and national agricultural research significantly decline along with reductions in investments in education and health, projections indicate that the number of malnourished children could increase to 200 million in 2020. Alternatively, should national and international agricultural research systems be strengthened along with increased investments in education and health, projections suggest that the number of malnourished children could decline to 100 million in 2020. Scenarios to the year 2020 developed for China suggest that if the rate of growth in investment in agricultural research and irrigation were to increase from 3.5 percent a year to 4.5 percent, China

would shift from being a net importer of grain to a net exporter by 2020 (Huang, Rozelle, and Rosegrant 1997). Grain production would be higher by 36 million tons in this scenario relative to the baseline. However, if growth in investment in agricultural research and irrigation were to decline from 3.5 percent a year to 2.5 percent, grain production would decline by more than 50 million tons relative to the baseline and China's imports in 2020 would triple to 76 million tons from the baseline forecast.

Genetic engineering and other agricultural biotechnology are among the most promising developments in modern science. Used in collaboration with traditional or conventional breeding methods, they can raise crop yields or productivity, increase resistance to pests and diseases, develop tolerance to adverse climatic conditions, improve the nutritional value of foods, and enhance the durability of products during harvesting or shipping. Yet, with the exception of a very limited amount of work by the centers of the Consultative Group on International Agricultural Research (CGIAR), little research in agricultural biotechnology is taking place in or for developing countries. Most biotechnology research is occurring in private firms in industrialized countries, focuses on the plants and animals produced in temperate climates, and aims to meet the needs of farmers and consumers in industrialized countries. Low-income developing countries are constrained in their pursuit of agricultural biotechnology research by limited public- and private-sector funding and by shortages of trained personnel. They can address these constraints, however, by providing incentives to the private sector to engage in such research, by collaborating with international research programs, and by seeking private- and public-sector partners in industrialized countries. It is essential that agricultural biotechnology research that is relevant to the needs of farmers in developing countries and to conditions in those countries is undertaken, and that the benefits of that research are transmitted to small-scale farmers and consumers in those countries at affordable prices. Otherwise, developing countries will not only fail to share in the benefits of agricultural biotechnology, but will be seriously hurt as synthetic alternatives to their products are developed in industrialized countries, as is already happening with cocoa and vanilla.

A more fundamental constraint to the use of agricultural biotechnology in and for developing countries is the attitude toward risk among the nonpoor in both industrialized and developing countries. Considerable resistance to agricultural biotechnology has arisen on the grounds that it poses significant new ecological risks and that it has unacceptable social and economic consequences. Although no ecological calamities have yet occurred, some people fear that transgenic crops will develop troublesome new weeds or threaten crop genetic diversity. Of course, any new products that pose such risks should be carefully evaluated before they are released for commercial development. But by raising productivity and food production,

agricultural biotechnology will reduce the need to cultivate new lands and could therefore help conserve biodiversity and protect fragile ecosystems. To address concerns about ecological risks, developing countries can adopt regulations that provide a reasonable measure of biosafety without crippling the transfer of new products into the field.

As for the social and economic consequences of biotechnology, some people are concerned that large-scale and higher-income farmers will be favored because they will have earlier access to and derive greater benefits from agricultural biotechnology. These concerns are remarkably similar to those raised about the Green Revolution. Whatever the shortcomings, real or alleged, about the Green Revolution, it did avert widespread starvation and helped many millions of people escape hunger once and for all. Similarly, agricultural biotechnology can contribute to feeding many more people in a sustainable way. Appropriate policies can make new technologies accessible to small-scale farmers. Instead of rejecting the solutions offered by science, we should change policies to assure that the solutions benefit the poor.

If we are to produce enough food to meet increasing and changing food needs, to make more efficient use of land already under cultivation, to better manage our natural resources, and to improve the capacity of hungry people to grow or purchase needed food, we must put all of the tools of modern science to work. In a world where the consequence of inaction is death for thousands of children daily and persisting hunger for millions of people, we cannot afford to be philosophical or elitist about any possible solution, including agricultural biotechnology. Modern science by itself will not assure food for all, but without it the goal of food security for all cannot be achieved.

REFERENCES

- FAO (Food and Agriculture Organization of the United Nations). 1996. *Food, Agriculture, and Food Security: Developments Since the World Food Conference and Prospects*. World Food Summit Technical Background Document No. 1. Rome: FAO.
- CGIAR (Consultative Group on International Agricultural Research). 1995. *Annual Report 1994-1995*. Washington, D.C.: CGIAR.
- Hazell, Peter. 1995. Technology's Contribution to Feeding the World in 2020. In *Speeches Made at an International Conference*. Washington, D.C.: International Food Policy Research Institute.
- Huang, Jikun; Scott Rozelle; and Mark Rosegrant. 1997. *China's Food Economy to the Twenty-First Century: Supply, Demand, and Trade*. Food, Agriculture, and the Environment Discussion Paper 19. Washington, D.C.: IFPRI.
- IFPRI (International Food Policy Research Institute). 1995. *A 2020 Vision for Food, Agriculture, and the Environment: The Vision, Challenge, and Recommended Action*. Washington, D.C.: IFPRI.
- Rosegrant, Mark; Mercedita Agcaoili-Sombilla; and Nicostrato D. Perez. 1995. *Global Food Projections to 2020: Implications for Investment*. Food, Agriculture, and the Environment Discussion Paper No. 5. Washington, D.C.: International Food Policy Research Institute.
- UN (United Nations). 1996. *World Population Prospects: The 1996 Revision*. New York: UN.

INTERNATIONAL BASELINE PROJECTIONS TO 2005¹

Rip Landes
International Baseline Coordinator
Economic Research Service

Introduction

As has been the case for the last several years, the USDA baseline calls for robust growth in global import demand. U.S. exports of high-value products (HVPs), including meats and horticultural products, will continue to show strong growth, generally outpacing bulk exports and accounting for a growing share of U.S. farm exports. Strong export growth is also projected for bulk commodities, particularly feed grains and wheat, driven largely by prospects for solid economic growth in developing countries. U.S. bulk commodity exports are projected to expand more rapidly than during the 1985-95 period and help propel total U.S. farm exports to average annual growth of about 4 percent. The baseline calls for tightening bulk commodity markets, with real prices that are declining, but at a slower rate than their long term trend (fig. 1). The extent to which global supplies will respond in an environment of firmer prices is a key uncertainty in the outlook.

USDA's annual baseline projections are the product of an interagency process chaired by the World Agricultural Outlook Board (WAOB). In addition to the WAOB, major contributions are made by commodity and regional analysts from the Economic Research Service, the Farm Service Agency, and the Foreign Agricultural Service. The published projections are based on a combination of model output and analyst judgement. A set of multi-commodity and multi-regional trade models helps to impose economic consistency on the USDA projections. Analyst judgement is used to address issues not handled adequately by the models, and generally has a more significant impact on the early years of the projections. While we welcome questions about our methodology, the remainder of our presentation will focus on key baseline results and issues.

It is important to understand and interpret the USDA baseline projections as a conditional long run scenario, rather than a forecast. USDA baseline assumptions are intended to generate a scenario that provides a neutral backdrop for analysis of the impacts of alternative policies, weather shocks, or other factors. These projections incorporate the provisions of the 1996 U.S.

¹ These projections are published in *Agricultural Baseline Projections to 2005, Reflecting the 1996 Farm Act* (WAOB-97-1), February 1997. *International Agricultural Baseline Projections to 2005*, a companion report providing foreign country details of the USDA baseline published by ERS, is forthcoming.

Farm Act, and assume that it is extended through 2005. They do not attempt to account for any shocks due to such factors as weather or business cycles. It is assumed that all countries comply with existing bilateral and multilateral agreements, including the Uruguay Round Agreement, but that no new bilateral or multilateral agreements occur during the 1997-2005 period. This is particularly important to keep in mind, given the upcoming World Trade Organization (WTO) mini-round, and potential agreements on WTO accession, European Union-15 (EU) enlargement, and bilateral trade that could emerge. Past agreements have had significant impacts on U.S. agricultural trade in recent years, particularly in HVPs, and so could future agreements. Most remaining assumptions, however, are consistent with expected future events. These include assumptions on income growth, parameters affecting agricultural supply and demand and, importantly, the evolution of agricultural policies in foreign countries. Thus, the process of unilateral policy reform in developing countries is not ignored in the projections, and assumed to continue to evolve based on analyst judgement.

Macroeconomic Outlook

Prospects for stronger economic growth in developing and transition economies, a common view among vendors of global macroeconomic forecasts, are a key driver of the USDA projections (fig. 2). Economic growth rates in Asia, the largest global and U.S. market for agricultural commodities, are expected to continue to lead the world through 2005. China and Southeast Asia are likely to remain the fastest growing areas of the world, fueling sustained rapid expansion of per capita incomes, food demand, and diet diversification. Although growth is likely to slow somewhat in East Asia (Hong Kong, Japan, S. Korea, and Taiwan), it will remain sufficient to yield steady gains in demand for an increasingly diverse diet.

While strong Asian growth is not new to the outlook, the significantly improved economic prospects in other developing areas differentiates the 1997-2005 outlook from the past 10-15 years. Significantly faster income growth is anticipated in Latin America (including Mexico), North Africa, and the Middle East during 1997-2005. This favorable outlook is encouraged by the progress made in implementing and sustaining economic and institutional reforms in many countries across these regions, but is heavily dependent on the continuation of reforms. For the Middle East and parts of North Africa, improved prospects are also linked to the forecast of strengthening real petroleum prices that is part of the USDA outlook.

Another important factor that should distinguish the next 10 years from last, is the restoration of positive rates of economic growth in the transition economies of the Former Soviet Union (FSU) and, particularly, Central and Eastern Europe (CEE). The variability and eventual collapse of effective demand in these countries was a key influence on global markets during the last 10 years. Restoration of positive, if slow, rates of income growth should halt the declines in food demand and stabilize trade. And, particularly in the FSU, increased market orientation and constrained budgets should reduce volatility in both economic growth and food trade.

Developing Countries Key to Demand Prospects

The most critical demand relationship at work in this long term food outlook is the one between per capita income growth and the pattern of consumer demand in developing countries. Particularly important is the relatively strong growth in meat and feed demand that typically occurs in developing countries with per capita incomes of \$500-\$5,000 (fig. 3). In the USDA projections, sustained rapid growth in Asia, combined with improved growth in Latin America, North Africa, the Middle East, and CEE, leads to robust expansion of per capita meat consumption and demand for feeds. Since most countries, and particularly developing countries, tend to produce meat domestically rather than import it, we expect most of the trade impact of this feed-livestock expansion to be in energy and protein feeds (fig. 4). Also important to the demand outlook is that many of these countries are at the stage of growth where food demand for wheat and vegetable oils tends to increase most rapidly.

The key role of developing countries in longer term agricultural commodity demand prospects is summarized in figure 5. Developing country demand growth will exceed world demand for all major commodities except rice. Aggregate developing country demand growth is highest in feeds, meats, and vegetable oils. Demand growth in developing countries is sharply higher than developed countries for feed grains and meals.

Future demand trends in China's large and dynamic economy are particularly important to the long term outlook. With its world-leading economic growth rate, it provides a dramatic example of the pattern of food demand growth that is typical in developing countries (fig 6). Food grain demand has shown little growth in per capita terms since the mid-1970s, while per capita demand for meats, feeds, and vegetable oils has soared. This pattern continues in the USDA projections, with slower, but still rapid growth in per capita meat and feed demand, and little or no growth in per capita food use of wheat or rice.

It is important to note that future demand (and supply) prospects in China are one of the key uncertainties in the global food outlook. With its large population, dynamic growth, uncertain future policies, weak data, and diverse food sector, China's long term outlook is likely to remain uncertain. The USDA projections strive to employ the best available information, and to find the central tendency in the estimates of the many uncertain parameters used in the China projections.

Expected Supply Developments

Firmer prices and supportive policies are expected to lead to a recovery in global grain area during 1996-2005 (fig. 7). In developed countries, the decline in grain area during 1980-95, was associated with global sluggish demand and supply management policies, primarily in the United States and the EU. During 1997-2005, we expect grain area in developed countries to rise with market incentives, increased planting in the United States, and reduced land set-asides averaging 12 percent in the EU.

In the transition economies, which saw the largest declines in grain area during 1980-95, we expect grain area to stabilize and grow moderately, predicated primarily on the recovery of domestic, rather than foreign, demand. In general, we expect the recovery in crop area to be consistent with the pace of institutional and policy reform and occur fastest in the Visegrad countries (Poland, Hungary, Czech Republic, Slovakia) and, to a lesser extent, Russia. The expansion of grain area in developing countries slowed during 1980-95, but did not show the decline evident in other regions. Cropped area in developing countries is likely to continue to expand in areas where climate and water availability will support more intensive cultivation. Grain area in both importing and exporting developing countries is also expected to rise in response to firmer prices.

By commodity, the global crop area projections reflect the pattern of demand, with the strongest increases in coarse grain and wheat area. Rice area continues to reflect the slow upward trend in rice demand. Oilseed area growth is projected to slow as strengthening grain prices increase competition for land, slowing growth in soybean area, and pulling some area out of rapeseed and other oilseeds.

Future Crop Yield Trends Uncertain

Future trends in crop yields are probably the major uncertainty in the long term outlook. Global yield growth appears to have slowed, although performance has varied by region, commodity, and time period (fig. 8). But, how will investment in both variable and fixed inputs respond and raise yields in the longer term as prices strengthen according to our scenario? The impact of increasingly market-oriented farm policies in the United States and some other developed and developing countries on supply response is unclear. In Latin America and other developing regions, it is unclear how the improving macroeconomic climate will affect agricultural investment and productivity. Further, it is increasingly difficult to predict the pace of development and adoption of biotechnology-related advances that will be coming on stream in the future.

The USDA projections attempt to capture the effects of these dynamic factors. In the current baseline, we project a significant recovery in yields for major crops in the FSU and CEE, but somewhat slower aggregate yield growth in both the developed and developing regions (fig. 9). Globally, wheat yield growth is projected to match performance during 1985-95, and corn yield growth is projected faster, but these results are predicated largely on the anticipated, but highly uncertain, rebound in the transition economies. However, our analysts remain cautious about the pace of reforms and prospects for productivity gains and the projections reflect this, as projected yields in both the FSU and CEE remain below historical highs. While we attempt to account for dynamic factors that may tend to strengthen yield growth in our scenario, it is possible their impact has not been completely accounted for.

China is also an important country to examine on the supply side of the equation. The official Chinese data indicate that yields for many crops, including wheat and corn, are high by world standards and suggest limited potential for future growth (fig. 10). However, evidence suggests

that yields calculated from official data are biased upward because area harvested is significantly underestimated. The bias is judged to be particularly large for corn. As a result, the USDA projections allow for substantial future yield growth from a lower level than indicated by official data. We look forward to the results of China's current agricultural census to help clarify this issue.

Major Commodity Trade Prospects

A summary of historical and projected growth rates in global imports shows that, although growth is projected slower for several commodities, particularly meats, projected demand remains strong for meats, feeds, and wheat (fig. 11). Particularly important to the U.S. trade outlook is the stronger expected growth in import demand for coarse grain, wheat and, to a lesser extent, cotton. The slowdown in meat trade, as will be discussed later, is largely associated with expected developments in East Asia, the FSU, and China, as well as with our assumption of no new market-opening agreements.

Coarse Grains

The USDA projections show broad-based growth in coarse grain import demand to support expanding feed-livestock sectors across developing regions, including China, South and Southeast Asia, Latin America, North Africa, and the Middle East (fig. 12). China's coarse grain imports are projected to rise more than 10 percent annually, and South and Southeast Asian imports about 9 percent annually. Annual growth in other developing regions is expected to be more modest, in the 3-4 percent range. East Asia, now by far the largest regional feed grain market, is expected to show very little growth, as trade reforms make local meat production uncompetitive and a rising share of meat consumption is imported. EU imports are also likely to remain relatively flat, due to sluggish growth in domestic meat demand, and export constraints imposed by UR export subsidy limits.

The FSU, a key source of instability in global coarse grain trade during the 1980s and early 1990s, is expected to be a small player in the market during 1997-2005. We expect only a slow recovery in meat demand and production, with domestically produced meat remaining uncompetitive with imported meats in key markets. With a smaller market presence and severe financial constraints, the FSU is unlikely to be as large a source of instability in global markets during the projection period.

The United States is expected to maintain its dominant two-thirds share of the global coarse grain market (fig. 13). EU competition, primarily barley, is likely to be constrained by the UR export subsidy limits throughout the projection period. While Argentina is expected to boost its corn exports, other traditional competitors are expected to be restrained by competition for crop land. The transition economies, primarily in CEE, are expected to be emerging competitors after 2000 when gains in U.S. corn area slow and prices strengthen.

Soybeans and Meal

The expansion of feed-livestock sectors in developing Asia, Latin America, North Africa, and the Middle East, is also expected to drive steady, robust growth in demand for soybeans and meal (fig. 14). Developing Asia, particularly China and Southeast Asia, is expected to be the fastest growing market, with imports expanding about 8 percent annually. Gains in these developing regions are projected to more than offset sluggish growth in feed demand in East Asia and the EU-15.

As was the case during the early 1990s, U.S. soybeans and meal are expected to maintain market share against South American competitors, with the U.S. share averaging 43-44 percent (fig. 15). Relatively large gains in U.S. soybean yields relative to Argentina and Brazil are expected to continue to underpin U.S. supplies and competitiveness, particularly during the next 5 years.

Wheat

As with feeds, income gains in developing countries are expected to drive stronger growth in wheat trade during 1997-2005 (fig. 16). In many developing countries, per capita wheat consumption remains responsive to rising incomes and urbanization, and capacity to produce wheat efficiently is limited. In China, although per capita wheat consumption is not expected to grow, imports are expected to expand about 4 percent annually as water shortages continue to inhibit yield gains. The North Africa and Middle East market, where we also project 4 percent annual import growth, is another key to wheat trade prospects. We expect wheat demand to respond to faster income growth in most of North Africa and the Middle East. We also expect limited production gains in some countries because of market-oriented reforms are reducing government support, as well as limited potential for area or yield gains. As with coarse grains, we expect the FSU to be a relatively small player in the global wheat market, with much less scope to be a source of instability, during 1997-2005.

Prospects for U.S. wheat market share are closely linked to policy developments in the EU (fig. 17). We expect U.S. share to recover from its 1996 decline and remain near its recent average of 34 percent through 2005. EU market share is expected drop until about 2001 as its exports are constrained by UR export subsidy limits, but then rise when world prices are high enough to permit unsubsidized exports. Gains in EU market share after 2000 are expected to come at the expense of less competitive emerging exporters, rather than U.S. sales. This scenario assumes a 12 percent EU land set-aside for 1998-2005, limited changes only to the administration of existing EU wheat intervention policies to permit internal market prices to drift below intervention, and moderate appreciation of the European Currency Unit against the dollar. A smaller EU set aside could increase its competitiveness after 2001, but would likely lead to rising supplies of barley that would be uncompetitive with wheat for domestic feed use, and not exportable under UR export subsidy limits. Assuming a change in the Common Agricultural Policy to reduce the wheat intervention price would also increase EU competitiveness, but is considered unlikely outside of a formal enlargement agreement with CEE countries.

Rice

World rice trade expanded sharply during the early 1990s, largely because Japan and South Korea began importing rice under the terms of the UR agreement, and two large markets, China and Indonesia, increased their purchases (fig. 18). The USDA projections call for these markets to grow slowly from their new levels. The projections also call for import demand in Latin America and, particularly North Africa and the Middle East, to respond to stronger income growth. The higher level of rice trade during early 1990s was supplied, to a large extent, by uncharacteristically large exports from Vietnam and India. We expect these countries, as well as Burma, to largely sustain their higher market shares through 2005. U.S. market share is expected to decline because of rising domestic consumption and lower planted area expected under the 1996 Farm Act.

Meats

The long term outlook for global beef, pork, and poultry trade is largely dependent on developments in three large markets: East Asia, the FSU and, for poultry, China (figs. 19, 20 and 21). East Asian meat imports, dominated by Japan (beef, pork, and poultry) and South Korea (beef), expanded rapidly during the 1980s in response to strong consumer demand and negotiated increases in market access. Based on already ratified multilateral and agreements, we expect steady growth in East Asian meat import demand as imports continue to substitute for relatively high cost local production. However, import growth will remain slower than during the 1980s and early 1990s unless additional market access is negotiated.

Large imports by the FSU, principally Russia, were also a significant feature of world meat markets during the 1980s. The collapse of inefficient domestic production, combined with the availability of credits and subsidies for imports from the EU and the United States, were key factors behind this trade. For 1997-2005, we see roughly steady import demand, based on very modest growth in consumer demand in the FSU, combined with very slow progress in the development of beef, pork, or poultry sectors that can compete effectively with imports. A decline in the availability of subsidized meat exports for the EU will be a significant constraint on growth in FSU pork and beef imports.

Imports by China, both direct and via Hong Kong, have been a source of rapid poultry trade expansion during the early 1990s. The rate of future growth in this trade is very unclear, in part because of the uncertain impacts of Hong Kong's accession to China on administration of trade via Hong Kong. It is also possible that limitations imposed by inadequate refrigerated transport and storage may eventually slow trade growth. Our projections assume that China's poultry imports slow from recent rates, but continue to show strong 10 percent annual growth.

U.S. beef, pork and, especially, poultry have been very competitive in world markets, capitalizing on new market opportunities to grow more than 20 percent annually in volume terms during 1985-95 (fig. 22). U.S. meat products are expected to remain highly competitive during

1997-2005 but, given the outlook for slower growth in imports by East Asia, the FSU, and China, and the baseline assumption of no new market access agreements, U.S. meat export growth is projected to slow significantly. Baseline growth in U.S. meat export volume is about 6 percent annually, with value growing somewhat slower as lower quality products continue to account for a growing share of U.S. exports.

Cotton

After showing little growth during 1985-95, world cotton trade is projected to expand about 1.2 percent annually during 1997-2005, the result of strengthening developing country demand and prospects for slow production growth in the FSU and China (fig. 23). Import demand in more developed regions, including East Asia will continue to slide as spinning moves to lower-cost regions. These declines are expected to be more than offset by rising imports in Southeast Asia, Latin America, and China. Slow growth in both imports and exports is expected by the FSU, as demand gradually strengthens and only limited production gains are achieved. The United States is projected to remain the largest exporter of raw cotton, maintaining roughly a 25 percent market share, while many competitors reduce raw cotton exports and channel supplies into consumption or exports of textiles and value-added products.

U.S. Export Outlook Remains Robust

In the current USDA baseline, the nominal value of U.S. farm exports shows robust annual growth of about 4 percent during 1995-2005, reaching nearly \$80 billion by 2005 (fig. 24). HVPs continue to lead the growth in U.S. agricultural exports, expanding about 5 percent annually. U.S. bulk commodity exports are also projected to show strong gains of more than 3 percent per year.

Each of the major categories of U.S. HVP exports--meats, fruits, and vegetables--is expected to show strong, steady annual growth of 5-7 percent in value terms (fig 25). These U.S. products are expected to remain highly competitive in their major markets, primarily East Asia, Canada, and Mexico. However, U.S. exports of these products are unlikely to sustain the rapid pace of the past 10 years. This is particularly true under baseline trade policy assumptions that include no new market access agreements. During 1985-95, market opening agreements with East Asian countries and NAFTA partners made these markets the key sources of U.S. HVP export growth (fig. 26).

Significantly stronger annual growth in the value of bulk commodity exports is expected to be a key source of strength in the U.S. trade outlook, and in the rural economy. Faster growth and firmer prices are projected for U.S. exports of most bulk commodities than occurred during the last 10 years, and particularly for coarse grains, wheat, and cotton (fig. 27). However, unlike HVP exports which generally depend on the more stable income and food demand growth of higher-income markets, bulk commodity demand and prices will be closely linked to the more fragile prospects for economic growth in developing and transition economies.

Figure 1. Real Prices Decline at Slower Pace as Markets Tighten

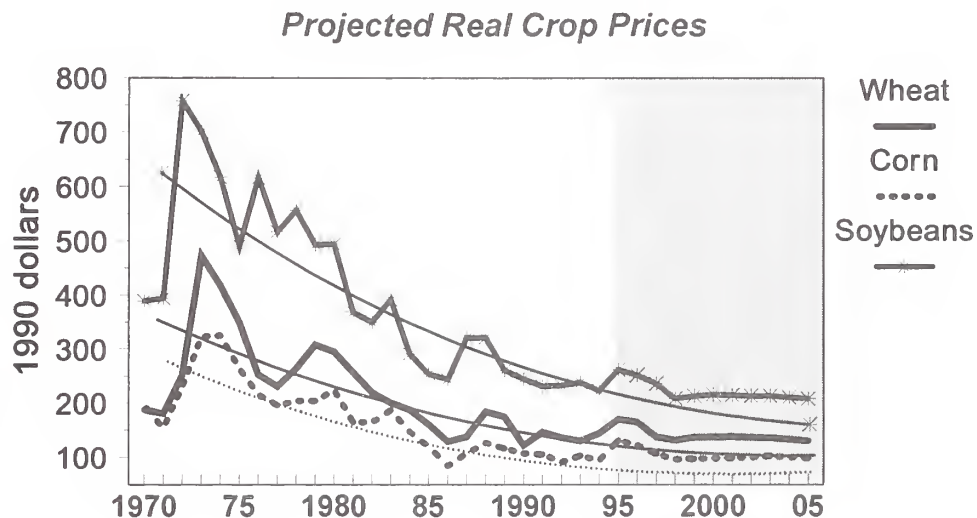


Figure 2. Global Economic Growth Key to Trade Outlook

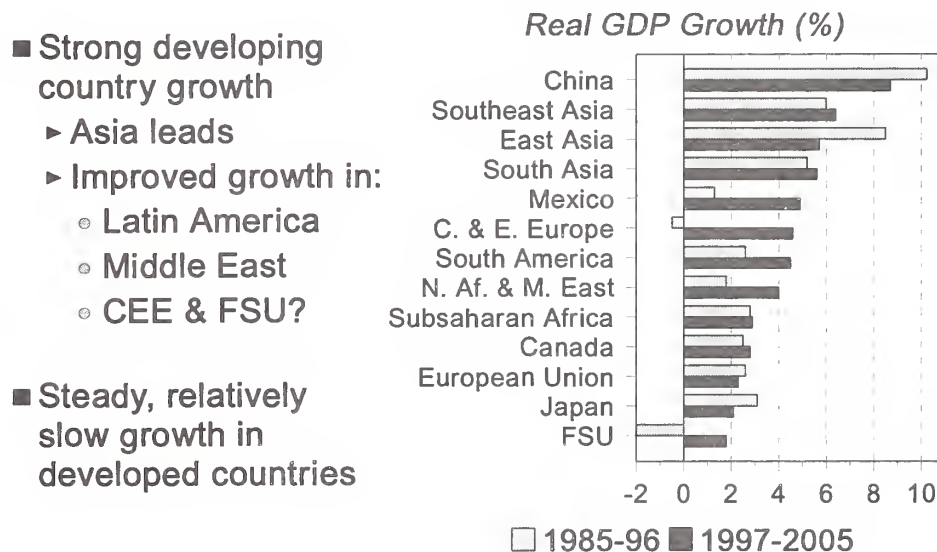


Figure 3. Strong Projected Growth in Meat Demand in Developing Countries

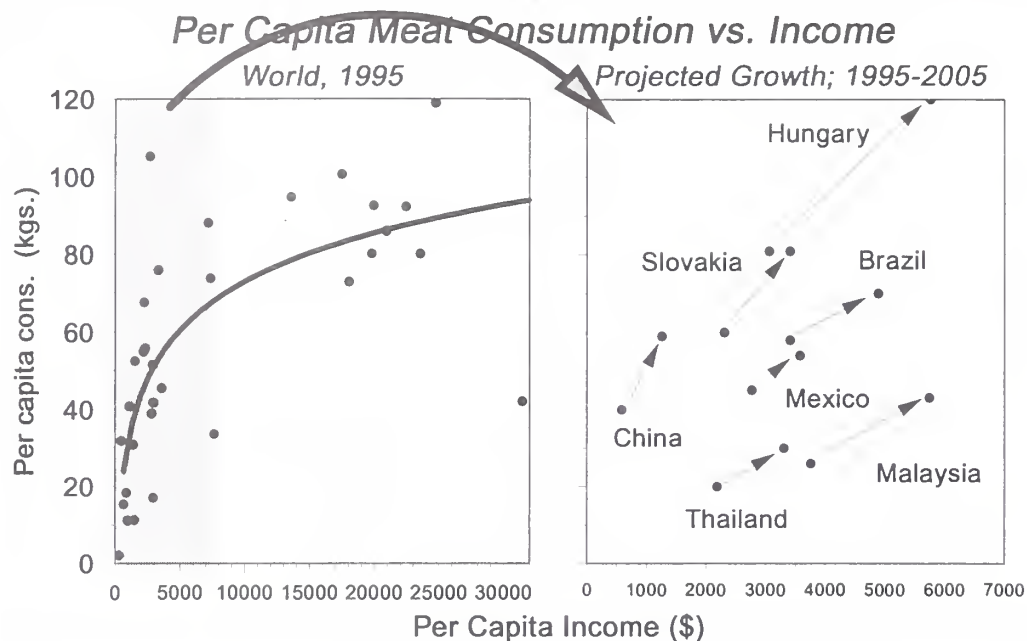


Figure 4. Most Countries Produce Their Meat Domestically

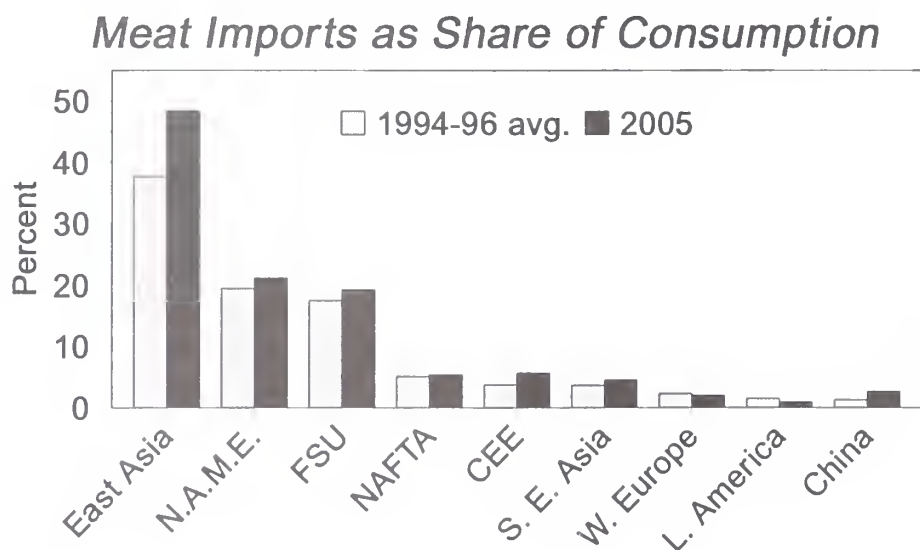


Figure 5. Developing Countries Lead Global Commodity Demand Growth

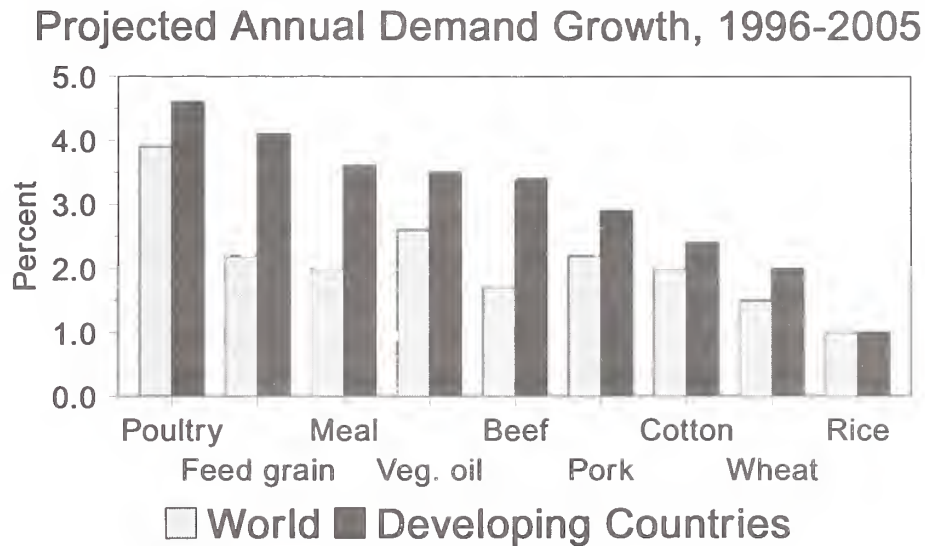


Figure 6. China: Most Growth Expected in Meat, Feed & Oils Demand

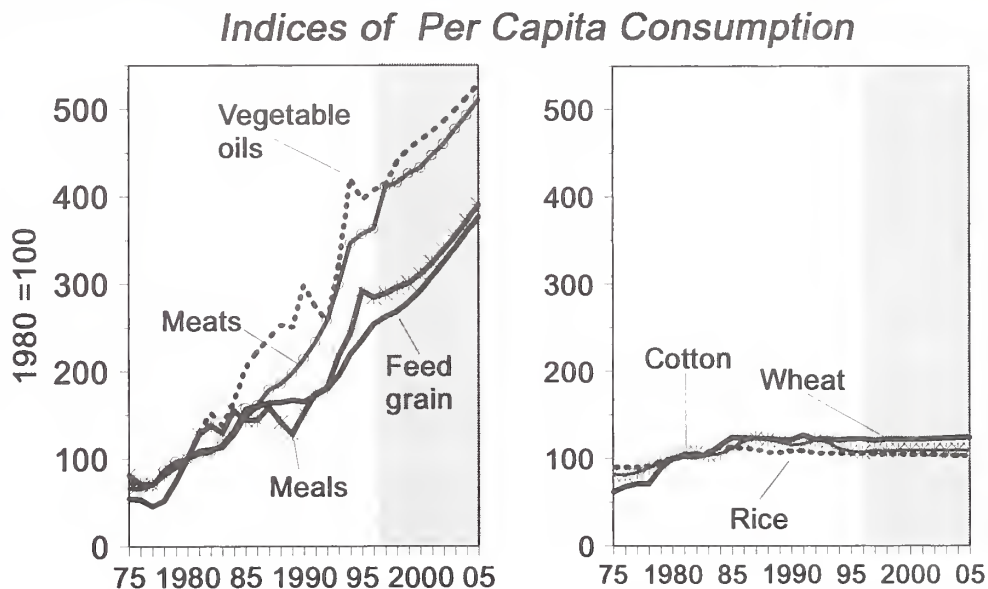


Figure 7. Global Crop Area is Projected to Rise

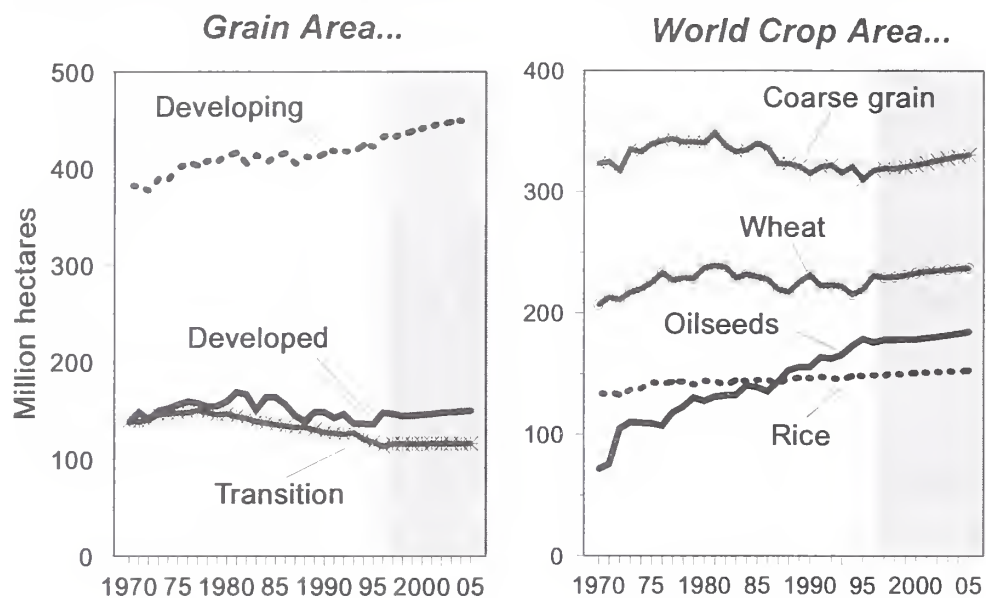


Figure 8. Global Yield Growth is Slowing

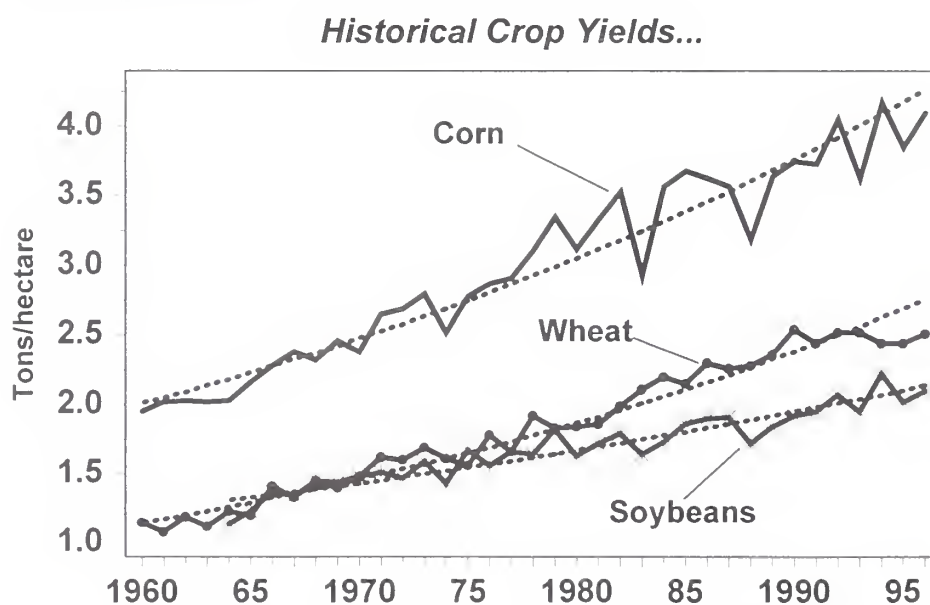


Figure 9. Yield Growth is Projected Slower in Most Regions

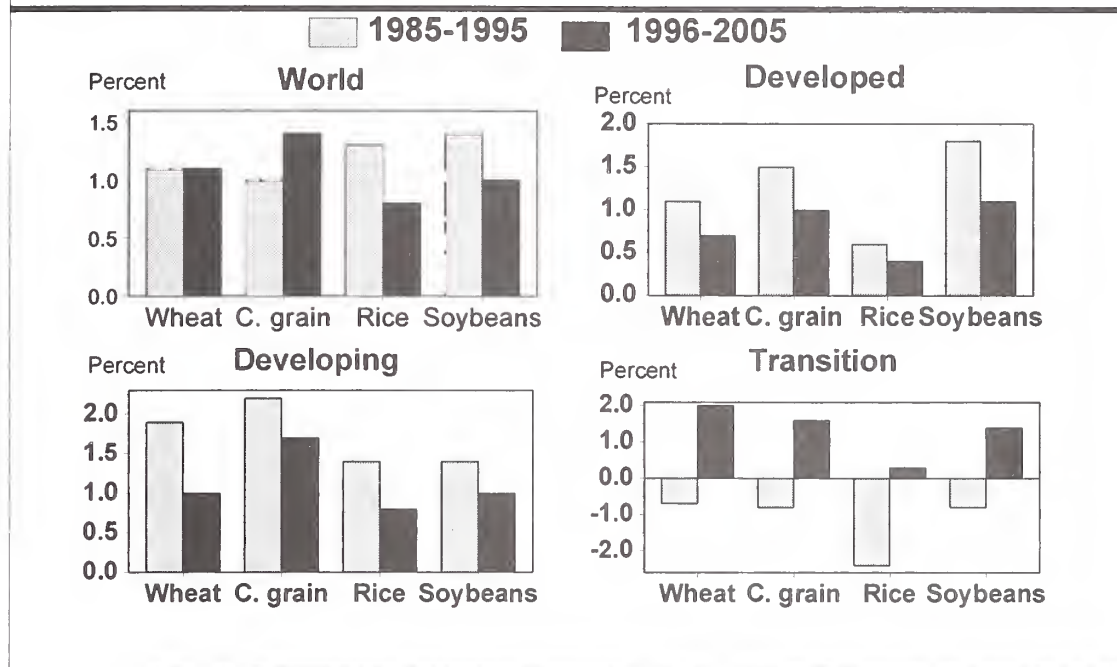
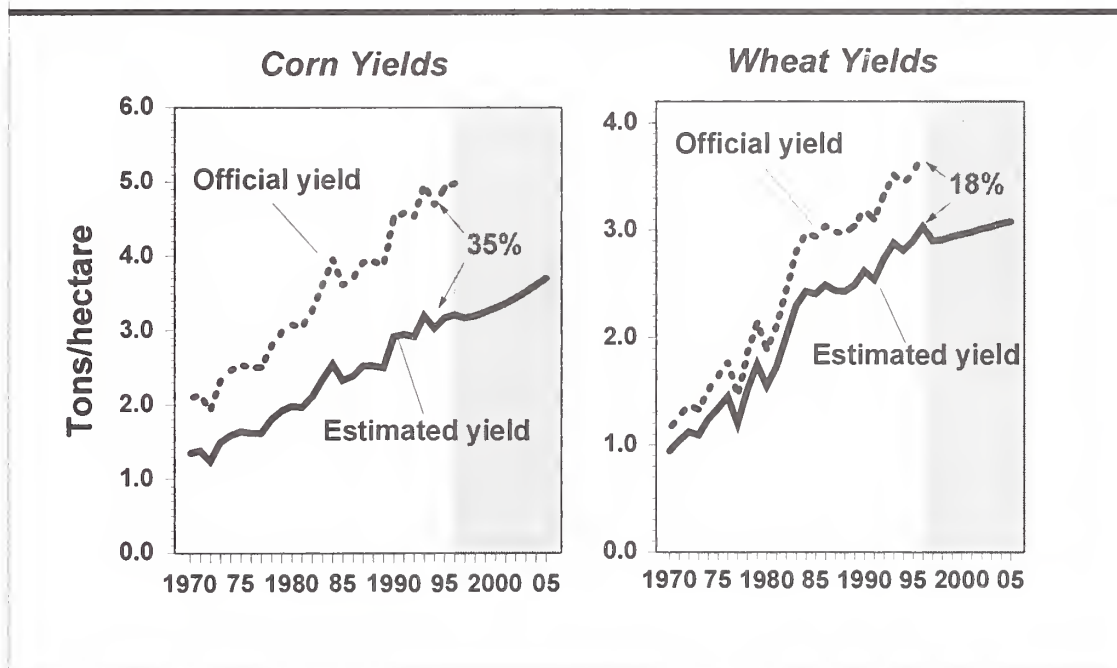


Figure 10. China: Estimated Yields Leave More Room for Gains



**Figure 11. Global Import Demand
Summary: Strong Growth Projected...**

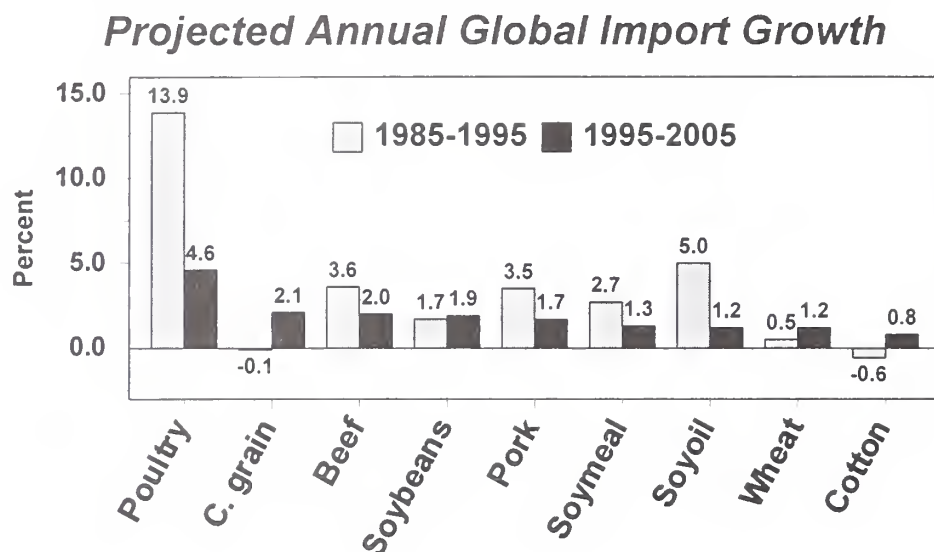


Figure 12. World Coarse Grain Imports

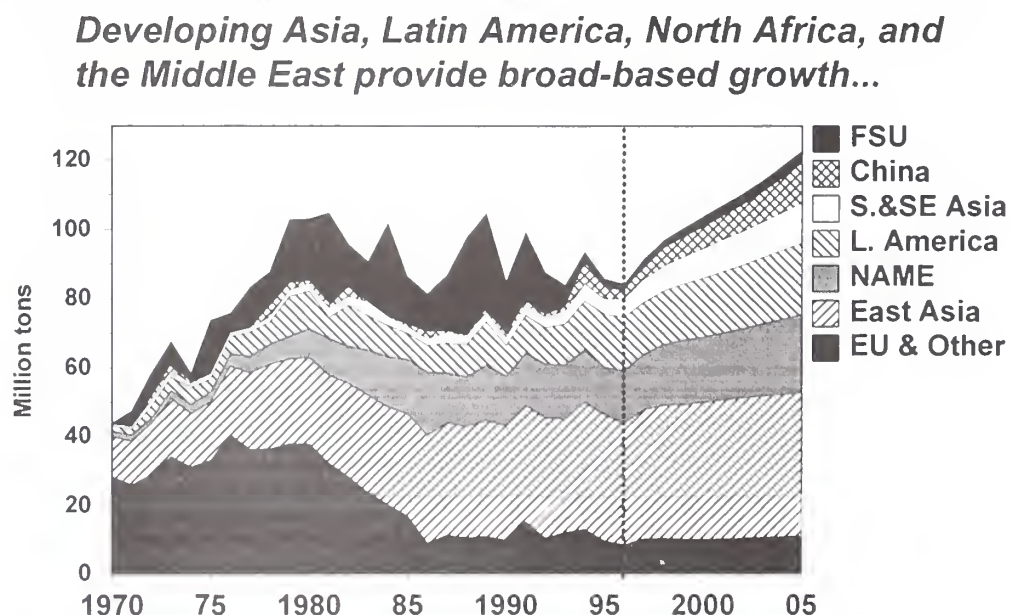


Figure 13. U.S. Projected to Remain Dominant Coarse Grain Exporter

Coarse Grain: Export Market Shares

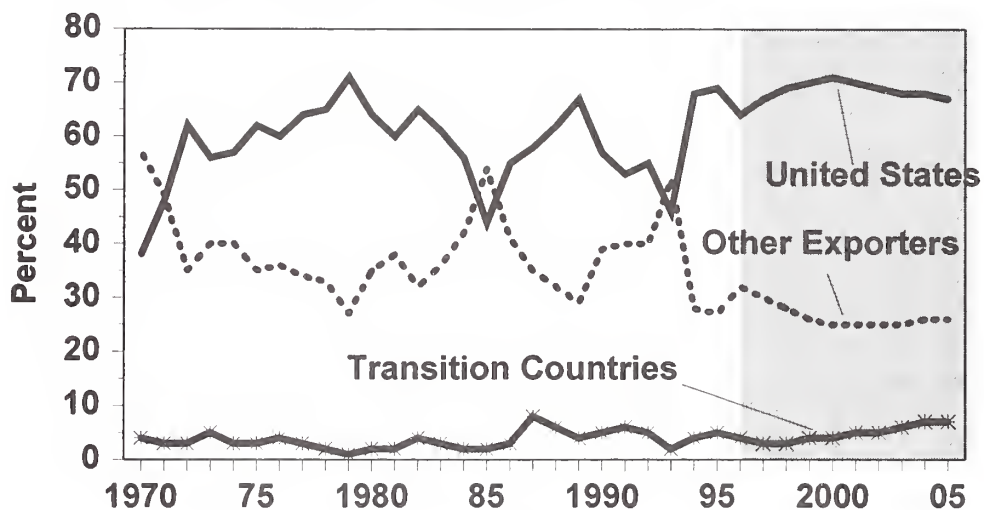


Figure 14. World Soybean & Meal Imports

Developing countries, particularly China and Southeast Asia, account for most growth...

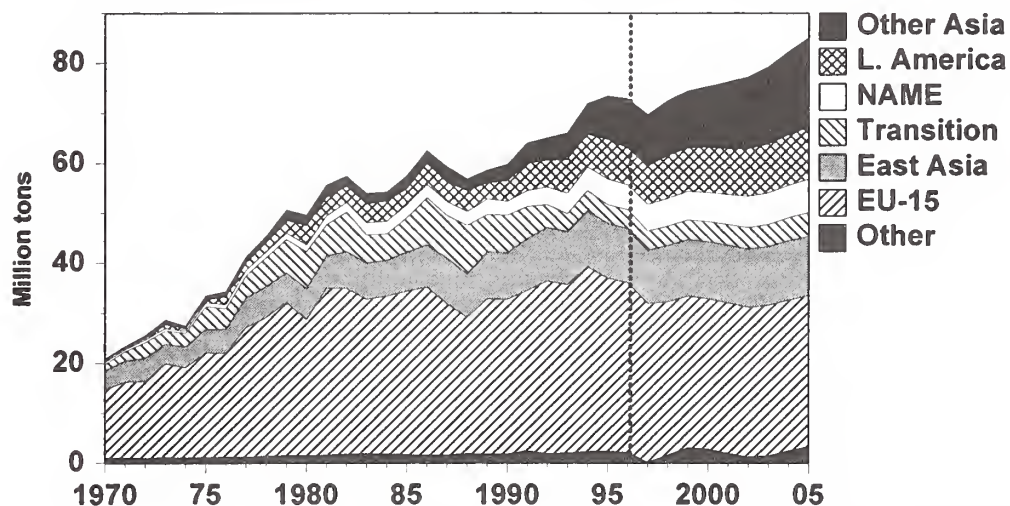


Figure 15. U.S. Projected to Maintain Market Share in Soybeans & Meal

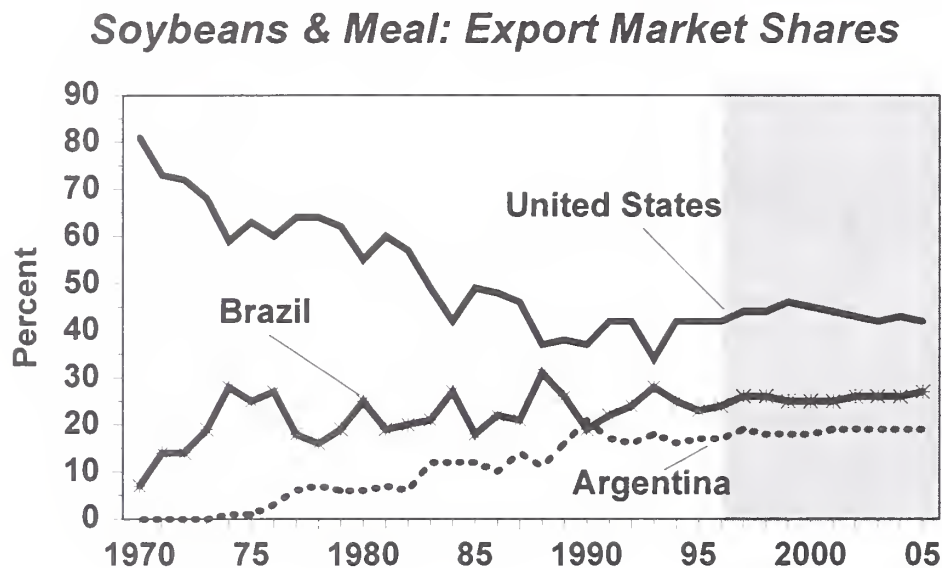


Figure 16. World Wheat Imports

Asia, China, North Africa & Middle East account for most of stronger projected growth in wheat imports...

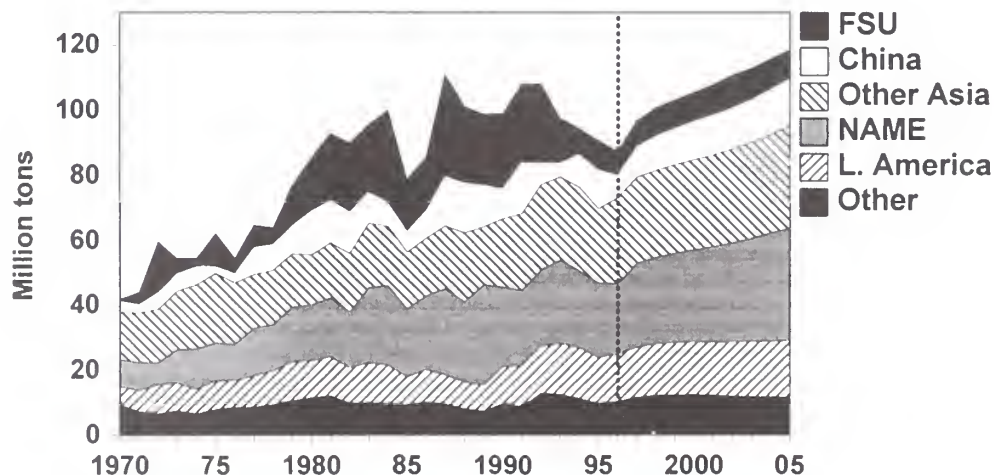


Figure 17. U.S. Wheat is Projected to Maintain Market Share

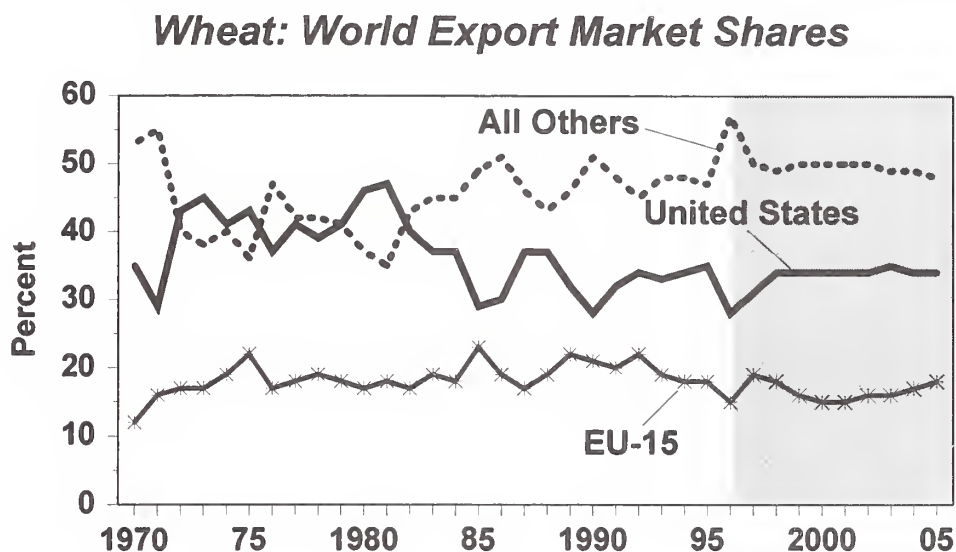


Figure 18. World Rice Imports

Asia, Latin America, North Africa & Middle East drive growth in rice trade...

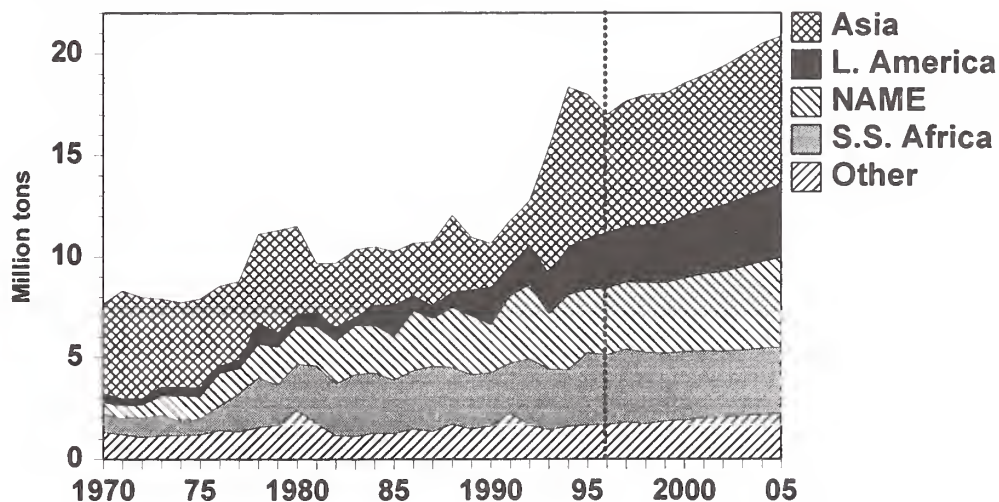


Figure 19. Major Beef Importers

East Asia, primarily Japan, accounts for most projected growth...

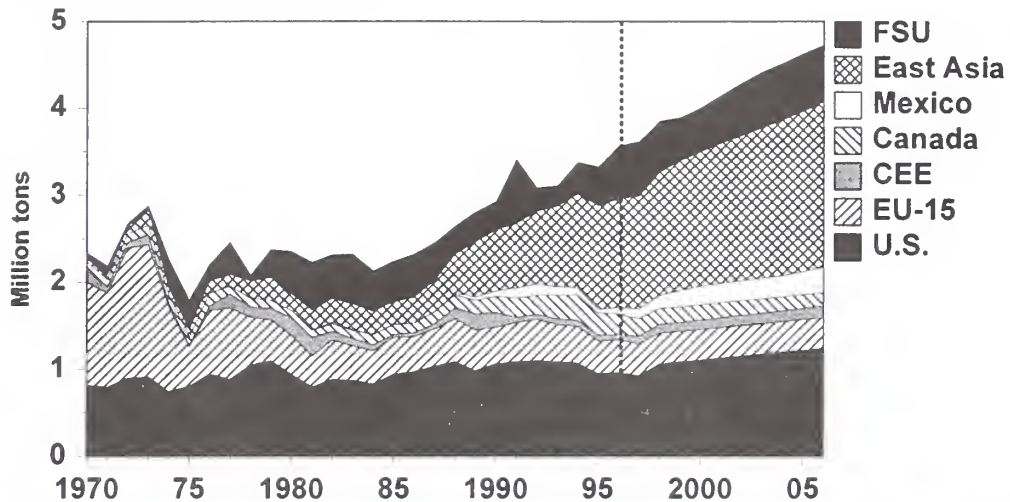


Figure 20. Major Pork Importers

Japan also accounts for most projected growth in pork imports...

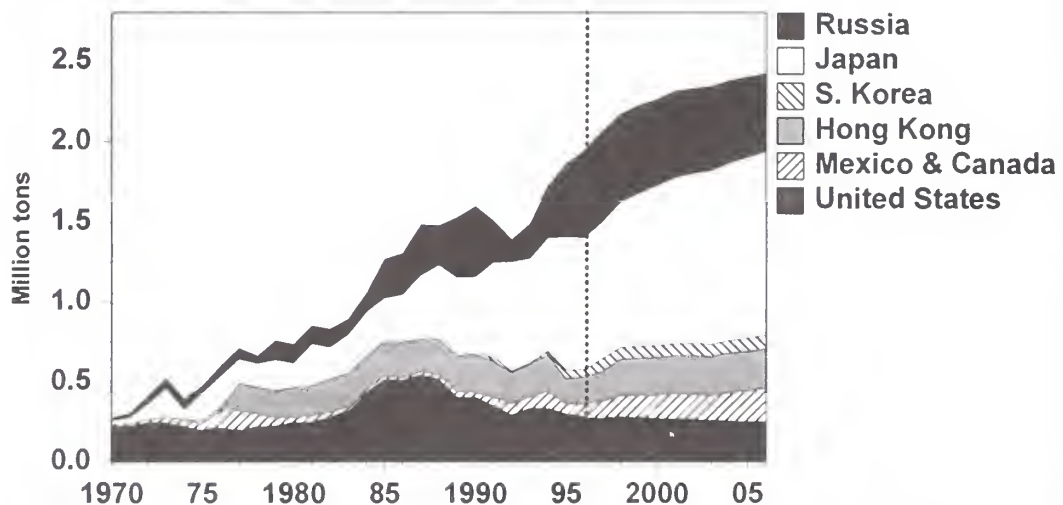


Figure 21. Major Poultry Meat Importers

East Asia, primarily Japan & China, accounts for most projected growth...

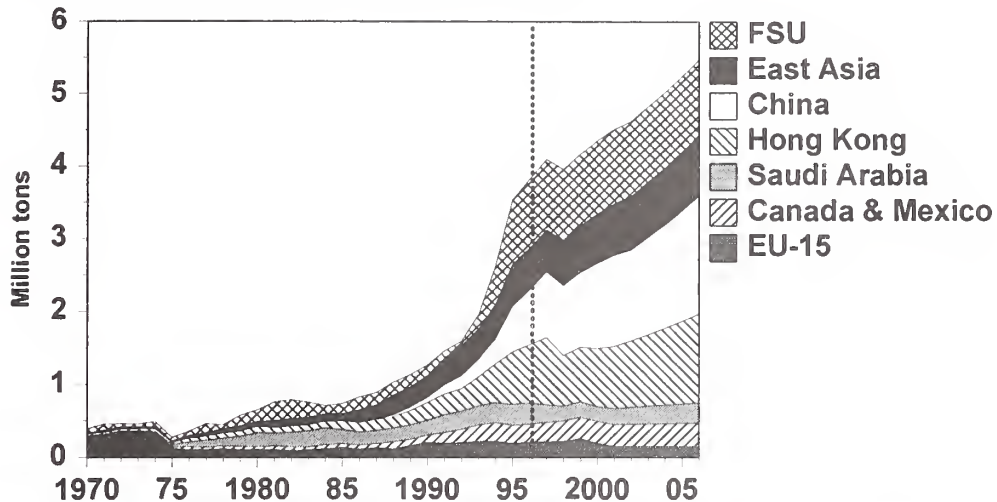


Figure 22. U.S. Meat Exports Projected to Grow, But at Slower Pace

U.S. Meat Exports

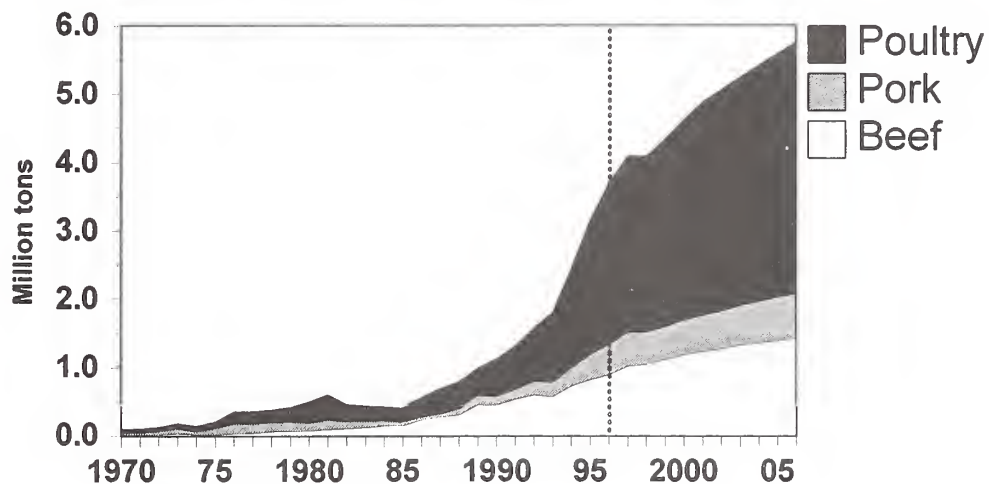


Figure 23. World Cotton Imports

China, Southeast Asia & L. America account for most growth, as spinning shifts to low wage areas...

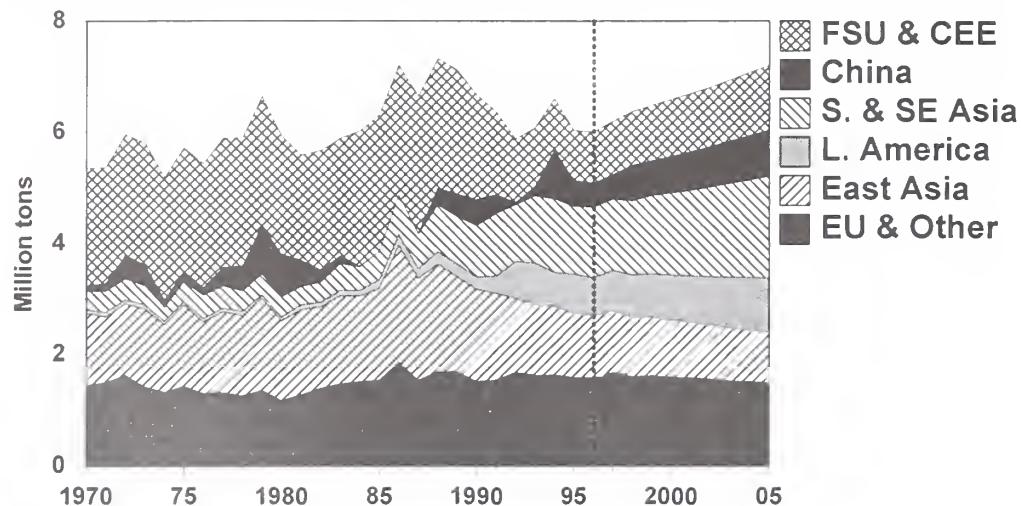


Figure 24. U.S. Agricultural Export Projections

- HVP exports continue to outpace bulk
 - ▶ Demand from Asia & NAFTA
 - ▶ U.S. highly competitive
 - ▶ But, assume no new market openings
- Bulk exports strengthen
 - ▶ LDC demand
 - ▶ Firmer prices
 - ▶ Less EU competition
- U.S. exports near \$80 billion in 2005

U.S. Export Value Growth Rates (%)

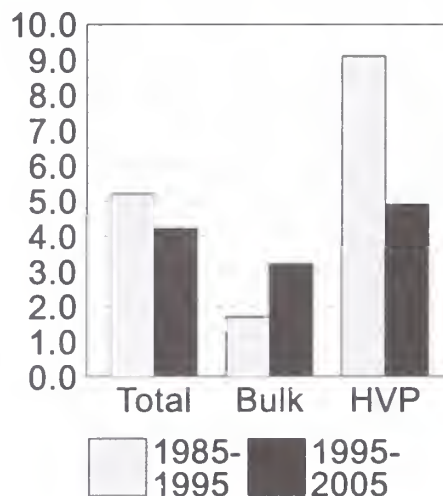


Figure 25. U.S. HVP Export Projections

- Robust, but slower growth in meat & horticultural exports expected
- East Asia & NAFTA lead growth
- U.S. competitive
- But, we assume no major new market openings

U.S. Export Value Growth Rates (%)

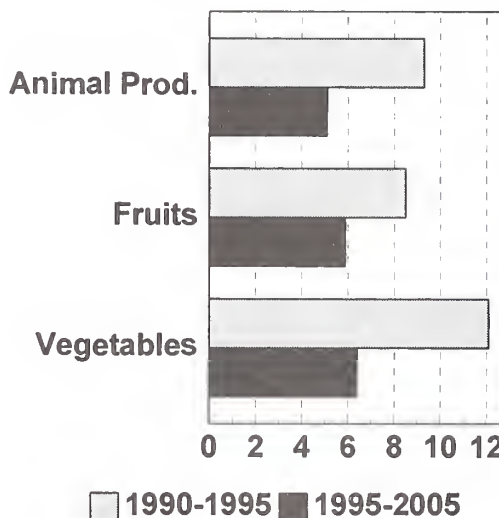
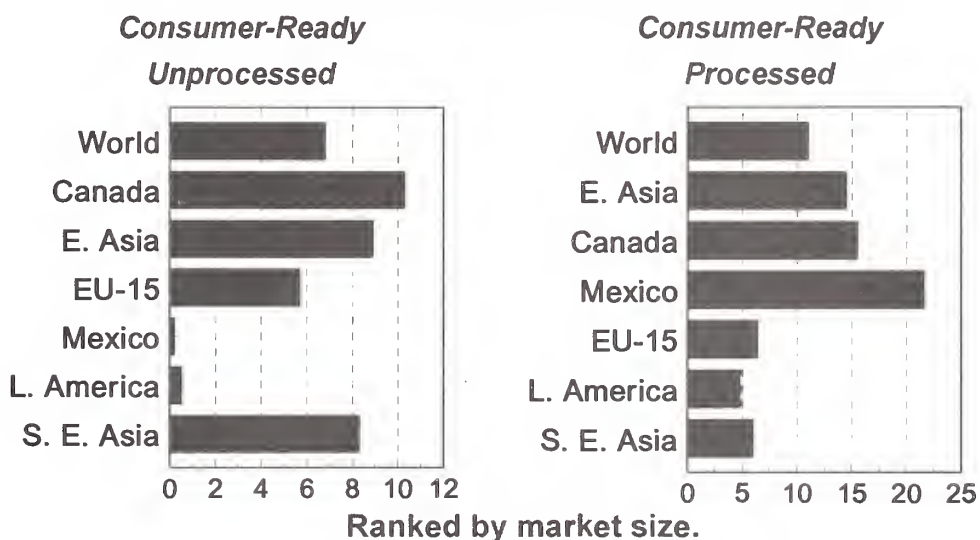
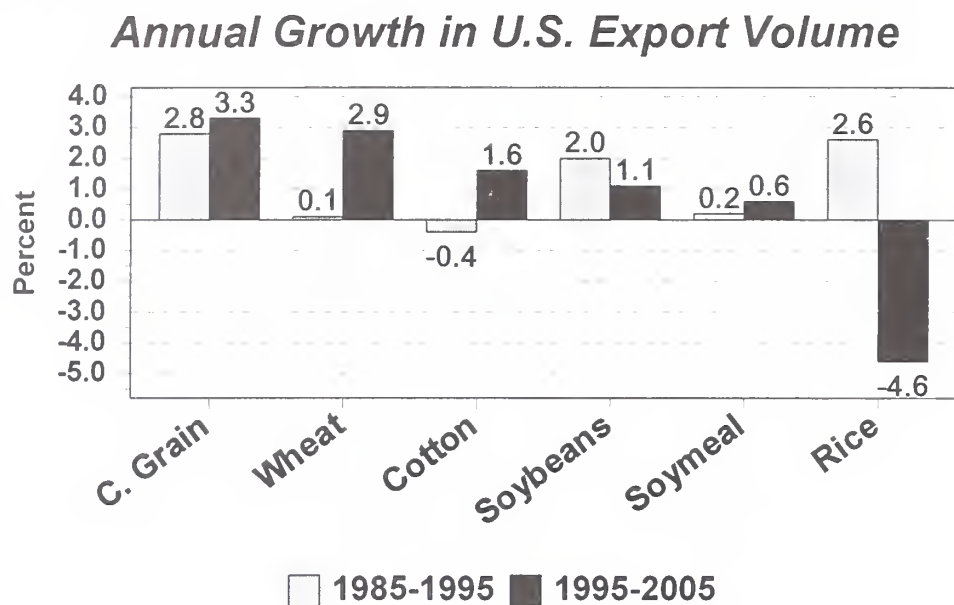


Figure 26. U.S. HVP Export Growth Fastest Where Markets Have Opened

Historical U.S. export growth rates...



**Figure 27. U.S. Bulk Commodity
Export Projections**



OUTLOOK FOR DAIRY: 1997 AND BEYOND

James J. Miller
Economic Research Service, USDA

1997 Production

Not enough acceptable quality forage was the dominant milk production story for 1996 and may well be again in 1997. Supplies of good alfalfa were tight in early 1996. The late, cool spring in the Midwest and Northeast resulted in first-cut hay that was late, poor, and low-yielding. The dismal first cut, along with direct climatic effects, produced the spring collapse in milk per cow. Although the later cuttings and the silage were better, forage quality was erratic. Western alfalfa hay production was large in 1996, but supplies of dairy-quality hay remained stretched by the region's now-large dairy herd.

The effects of a 19-percent boost in concentrate ration value were mostly offset by higher milk prices. The milk-feed price ratio averaged just less than the 1993-95 average, while returns over concentrate costs rose 15 percent from 1995. However, the ratio was low during the spring of 1996, limiting the ability of farmers to compensate for forage quality problems.

Milk per cow recovered during the second half. But, second half increases from the weak 1995 output were hardly impressive and were eroding by January 1997. Ironically, the region with the most weakness in January milk per cow was one not in the news because of weather--the Northeast.

Milk per cow will be dogged by forage problems through most of the first half. In addition, the effects of heavy precipitation and mud in California, Washington, and Idaho may persist for 6 to 12 months. First-half milk-feed price ratios probably will not favor much increase in concentrate feeding.

If decent supplies of hay become available on schedule, milk per cow probably will post sizable spring and summer gains. Even so, 1997 growth is projected to average only about 2 percent, not much following a year of no gain. Even this rise may not be attainable if 1997 forage crops have problems or if western stress and mastitis problems are worse than expected.

Declines in milk cow numbers sharpened steadily during 1996. A single year of higher returns did not do much to slow the exit of farms under income stress, particularly not a year of bad forage and high feed prices. Meanwhile, the expansion rate of other operations slowed significantly. It was simply too risky to attempt a major expansion with such highly uncertain forage conditions. These patterns will largely continue through the first half of 1997.

Returns over concentrate costs in 1997 are projected to lose about half their 1996 increase. Even so, returns would remain well above 1992-95. Two straight years of stronger returns should spark renewed expansions and fewer exits. However, the uncertain forage situation probably will keep these forces on a fairly tight rein until late 1997. Milk cow numbers are projected to average more than 1 percent lower.

Milk production in 1997 is projected to about recover the 1 percent lost in 1996. Although pressures for another jump may be building, they are more likely to emerge in 1998 than in 1997. In fact, most of the uncertainties seem to be lining up on the low side of the current projection.

1997 Use and Trade

In 1996, record quantities of dairy products were sold at very high prices--the classic definition of strong demand. A substantial economic expansion boosted consumer incomes, part of which they devoted to dairy products. Commercial use of milkfat was about unchanged in 1996, as growth in domestic use was enough to offset a decline in commercial exports. Meanwhile, commercial use of skim solids rose fractionally. Cheese sales were strong and use of nonfat dry milk was firm. Fluid sales grew fractionally after a couple of stagnant years. Commercial use of butter declined moderately, partly because of smaller exports.

Expected 1997 income gains should buttress dairy demand. Even so, growth in commercial use may be a little sluggish, particularly during the first half. Although prices to wholesale users will be lower than 1996 through most of 1997, first-half increases in retail prices will be large. In addition, another decline in commercial butter exports is likely. For the year, commercial use is projected to rise about 1 percent on either a milkfat or skim solids basis.

International market prices have edged steadily higher from their summer lows, despite strong production gains in New Zealand and Australia. Importers had to re-enter the markets after letting prices decline during the first half. However, import demand remains somewhat soft. Mexico and Algeria have purchased dry milks, but only in modest quantities. Russia continues to import substantial butter, but some other buyers have backed off.

International market prices are expected to be steady to slightly higher during the rest of 1997. Export supplies probably will be about unchanged, at least until late 1997, and stocks remain modest. However, there is no indication of a real recovery in import demand. Poorer importers continue to shift to less expensive substitutes. A firmer international market and a less tight domestic market should result in larger dry milk exports under the Dairy Export Incentive Program (DEIP). Even so, DEIP exports may not reach the GATT limits unless importers become more aggressive than expected. Total butter exports probably will be slightly lower, as DEIP exports may not make up for the loss of commercial exports. Cheese exports are projected to be about the same to slightly higher.

1997 Prices

The wholesale price yo-yo continues. Early 1996 prices were fairly strong because of good demand. When the demand was joined by spring production drops, summer prices soared. By late summer, production was recovering, sales were easing because of high prices, and stocks were not declining normally. Price declines were due, but the subsequent crashes proved to be an over-reaction. Butter and cheese prices have both recovered somewhat from December lows.

Additional recovery in cheese prices is expected and may also be in store for butter prices. Given the production uncertainties, wholesale prices may be unsettled through spring and summer.

Farm milk prices in 1996 averaged \$14.74 per cwt, up almost \$2 from 1995 and almost \$1 from the previous record. Milk prices in 1997 are projected to run below a year earlier throughout the year, averaging about \$1 per cwt lower. However, projected 1997 prices would be relatively high compared with the late eighties and early nineties.

Retail dairy prices rose 7 percent in 1996, the largest increase since 1990. Almost all the increase was due to farm milk prices, as the farm-retail price spread was almost unchanged. Retail dairy prices are projected to edge lower during the first half of 1997 but will be far above a year earlier. Second-half prices are expected to be about steady and may slip below 1996 levels. The farm-retail spread probably will post large increases, particularly during the first half. The annual average rise in retail prices is projected to be 1 to 3 percent.

The potential production weakness and the evidence of continued strong demand imply that the odds of prices higher than expected are greater than the chances of lower than expected prices. In addition, the possibility of continued volatility in dairy prices will remain until production conditions return to a more normal state.

Beyond 1997: Commercial Use

Commercial use of dairy products is projected to grow just barely faster than the 1-percent increase in population. The total will continue to be a mix of strong and weak products. However, some of the individual product trends may be considerably different from the past.

The days of automatic shifts from whole milk to 2 percent milk are over. In recent years, whole milk sales have been about steady while 2 percent milk use has dropped. Meanwhile, sales of skim milk have grown sharply since the late eighties, after being stagnant for decades. It is not clear how the complex mix of demographic, dietary, eating pattern, and taste patterns will resolve themselves, but fractional trend increases are projected.

Cheese sales are expected to grow, although percentage rises from the current high base are apt

to be smaller than in the past. Cheese's convenience, versatility, diversity, and dish-enriching capabilities will keep it in a strong position. However, gains in cheese use may not be quite as immune to bad years as in the past.

Milk solids have well-known capabilities to improve the quality of many processed foods--even when used in fairly small amounts. As long as they remain relatively inexpensive, milk, cream, butter, dry milk, and condensed milk probably will be used in larger amounts in processed foods. This trend is a reversal of the pronounced downtrend of most of the sixties, seventies, and eighties.

Retail butter sales will depend largely on where relative prices of butter and margarine settle. Most of the recent butter gains are expected to remain, but the overall table spread market will remain under pressure. Sales of soft products are projected to be about steady.

Beyond 1997: Milk Production

Annual declines in milk cow numbers are projected to be less than 1 percent. Western growth will continue but at a slower expected rate. There probably will be fewer areas with the potential for explosive growth and regional alfalfa supplies will be more limiting than in the past. However, development of large, industrial-style farms probably will accelerate in northern dairy areas. In addition, use of intensive grazing techniques will prolong the viability of some dairy farms, particularly in areas of marginal agriculture.

Milk per cow is projected to grow slightly less than 2 percent per year. Milk-feed price ratios are projected to average less than 1.6, relatively unfavorable to increased concentrate feeding. Further adoption of bST will help support increases in milk per cow. However, experience so far would indicate that the effect of bST on increases in milk per cow will be quite gradual.

In the last 10 years, there have been 2 multi-month periods with milk per cow below a year earlier, along with a sprinkling of individual months. Since World War II, the only other such periods were twice in the mid-seventies, when milk-feed price ratios hit extraordinarily low levels, and in 1984, when farmers were paid to cut milk marketings. This increased instability of milk per cow probably will remain with us. Cows are more concentrated geographically than in the past, increasing the chances that local weather conditions do not "average out" nationally. Also, the current very heavy levels of concentrate feeding limit farmers' ability to compensate for poor forage by boosting grain feeding.

Milk production is projected to grow slightly more than 1 percent per year, significantly slower supply shifts than during the eighties. Growth in milk output may be less steady as well as slower. Forage and weather conditions may have more effect on when farms expand or exit, as well as affecting milk per cow.

Beyond 1997: International Markets

International dairy markets are expected to be less prone to periods of very low prices, but prices are projected generally to be below U.S. prices. The GATT export disciplines will forestall surges in subsidized exports. However, production by non-subsidizing exporters is expected to grow in response to the higher international prices of recent years. Average growth of 4-5 percent in Australia and New Zealand seems quite attainable as grazing land is converted to dairy use. Milk output in parts of South and Central America also is likely to grow. On the other hand, milk production may be weak in much of Eastern Europe, as the transition from state farms to private production has been difficult. The expansion in world export supplies is expected to about keep pace with world import demand. Although dairy imports may grow substantially in areas such as East Asia, the recent higher prices may lead to use of substitutes in some of the poorer traditional importers.

Export supplies of butter are projected to be fairly steady. EU exports should not vary much and the United States will be a smaller supplier. Most of the increase in Oceanic milk production is expected to go into cheese, leaving butter exports about the same. Import demand from the Former Soviet Union, the Middle East, and North Africa is expected to be fairly solid, but demand for butter is not projected to grow much.

Export supplies of dry milks are also expected to be fairly steady. Import demand will grow in some areas. The westernization of Asian diets should result in demand boosts. On the other hand, a number of countries are developing whey-based beverages to replace more expensive nonfat dry milk. Total import demand is projected to be strong enough to generate a gradual uptrend in international dry milk prices.

The restrictions on EU cheese subsidies and growing import demand are expected to make the cheese markets the strongest of the international dairy markets. Pizza alone is creating markets for cheese where none existed before. However, aggressive expansion of cheese capacity in New Zealand and Australia promise to keep cheese prices from deviating too far from parity with butter and nonfat dry milk.

Beyond 1997: Prices

Prices that keep production and commercial use balanced are projected to edge higher, but trailing general price levels. Aggregate demand shifts are expected to be similar to the past, but supply shifts probably will be considerably more modest than during the eighties. Commercial exports are expected to only occasionally be important for domestic market prices.

Milk prices probably will stay relatively volatile. Growth in western cheese capacity should help curb some of the large price disparities of recent years, and the industry may be learning the need for larger stock levels. But, year-to-year production changes probably will be less certain, and

price disruptions from the international markets may be more common. In addition, demand response may be changing as the retail market shrinks in importance relative to restaurant and ingredient markets.

OUTLOOK FOR U.S. TOBACCO

Tom Capehart
Agricultural Economist, Economic Research Service
U.S. Department of Agriculture

The outlook for U.S. tobacco through the end of the 1990's improved as we traversed the middle third of the decade. After a ten-year decline, cigarette consumption leveled off in the past four years. Cigarette export volume gains, which seemed transitory earlier in the decade continued, boosting total output. Lower-than-expected leaf production in the past two years due to weather and disease, combined with higher manufacturers' purchase intentions and reduced stocks boosted quotas for the past and upcoming season.

Near-term Situation and Outlook

For the next few years, domestic cigarette consumption is likely decline slowly from current 487 billion pieces, mostly due to higher taxes and greater restrictions on where people can smoke. The cumulative effects of regulations limiting where people can smoke, higher taxes in many States, and advertising restrictions and health concerns have resulted in an equilibrium consumption of about 2,500 cigarettes per capita and with about 25 percent of the population smoking cigarettes. A few years ago, State tax increases and increased regulation of smoking in public areas and workplaces were the major forces depressing cigarette consumption. The threat of Federal excise tax increases added to the industry's glum mood. The tax increase never materialized and lower prices since 1993 helped nullify the other factors. All of these factors could regain importance in the future. Now, in the final third of the decade, the major challenges to cigarette manufacturers are from litigation and FDA regulation.

Cigarette exports are expected to continue rising through the end of the decade. Offshore production has not materialized to the extent previously anticipated, in part because of the demise of the 25-percent limit on foreign tobacco use in U.S.-manufactured cigarettes. The Tariff Rate Quota now in effect has effectively reduced the cost of producing cigarettes in the United States by allowing greater use of lower-priced imported leaf. Also, effective publicity campaigns worldwide have generated strong demand for U.S. cigarette brands, most of which are produced in the United States.

In 1996, U.S. growers produced 1.6 billion pounds of tobacco valued at an estimated \$2.7 billion compared with 1.3 billion pounds valued at \$2.3 billion in 1995. That's a 23 percent gain in volume. For the 1996 season, the most notable factors were the hurricanes which destroyed significant amounts of Coastal Plain flue-cured and another outbreak of blue mold in the burley belt, both of which resulted in tighter-than-expected supplies, high prices regardless of grade,

virtually no loan takings, and low cooperative stocks at the end of season. The leveling off of cigarette consumption, advancing cigarette exports, a reprieve in the threat of Federal tax increases, and slightly higher leaf exports combined to create strong demand.

U.S. leaf exports increased nearly 6 percent in 1996, reflecting a smaller price differential between U.S. and foreign leaf, higher U.S. production, and low world leaf stocks.

The U.S. tobacco outlook for 1997/98 reflects the lowest domestic stocks in the post-war era and increased use by cigarette manufacturers. After flue-cured prices gained 4 cents per pound and burley prices have so far averaged 6.8 cents per pound above the previous season, what's in store for 1997? Prices in 1997 will depend on weather, farmer response to the high quota, and global conditions, which Pete Burr will discuss in the following presentation. The flue-cured quota for 1997 is 705 million pounds, with an effective quota of about 1,020 million pounds. The burley quota is 705 million pounds with an effective quota of 900 million, the highest since 1971 when burley first had poundage quotas. Given these large increases in both the flue-cured and burley quotas for 1997, total U.S. tobacco production is expected to increase, perhaps reaching 1.7 billion pounds. Labor and barn space may in short supply and could reduce the amount of the quota actually grown. Prices are likely to decline from this season's level. With price supports at \$1.62 for flue-cured and \$1.76 for burley, loan takings will almost certainly increase.

After falling in 1995/96, use in 1996/97 is expected to regain lost ground but not quite reach 1994/95's levels. U.S. production advanced 22 percent in 1996/97 but low carryin stocks limited supply to 3.7 billion pounds.

U.S. cigarette production in 1996 is expected to exceed 750 billion pieces, 1 percent higher than last year. Retail tobacco product prices in calendar 1996 averaged 3.2 percent higher than in 1995. State excise taxes weighted by sales average 32.4 cents per pack in July 1996. State tax rates vary from 2.5 cents per pound in Virginia to 82.5 cents per pack in Washington State. Two States raised their tax rate in 1996, and the Federal tax remains at 24 cents per pack.

Cigar production and consumption, especially of premium brands continues to expand. Cigar consumption in 1996 are expected to increase nearly 20 percent over 1995. Continued gains in premium cigar sales for the next few years are expected.

In the longer term, the U.S. cigarette industry and tobacco growers could face the following challenges:

- * Increased competition from other major tobacco producers.

U.S. growers cannot let the current season's strong demand lessen their commitment towards higher quality and price competitiveness.

- * Specter of increased Federal or State taxes on cigarettes.

The potential for State tax increases is certain, and sooner or later, Federal tax increase proposals

will re-emerge.

- * Potential for significant changes in the tobacco production quota and price support program. Parts of the tobacco program have narrowly withstood proposals for their elimination in recent sessions of the U.S. House of Representatives.

- * Increased regulation by FDA or OSHA

As evidenced by the February 10 hearings in North Carolina, the push to increase regulation will almost surely continue.

- * Litigation and/or settlement costs large enough to affect profits or drive up cigarette prices. Continued litigation is certain, while the potential costs remain unknown.

THE FOREIGN TOBACCO OUTLOOK

by

Peter W. Burr
Foreign Agricultural Service
U.S. Department of Agriculture

Tobacco plays a very important role in the economic well being of many nations worldwide. Preliminary assessments indicate that the 1997 tobacco crop will be larger in several of the world's major producing countries including Argentina, Brazil, Malawi, Mexico, Turkey, Zimbabwe, and China. China is by far the world's leading leaf producer, accounting for nearly 40 percent of the world's leaf tobacco crop in 1996. Total world unmanufactured tobacco output in 1996 reached 7.17 million tons (farm-sales-weight), up 10 percent from 1995.

Brazil:

Brazil's production of total unmanufactured tobacco is expected to reach 525,000 tons in 1997, up about 16 percent from 1996. Much of the rise in output stems from increased plantings due to industry expectations that foreign demand for Brazilian leaf will be higher in 1997 and that cigarette production for export will also increase. Yields are forecast to rise in 1997 as favorable weather conditions which prevailed early in the growing season are expected to continue. Flue-cured tobacco is the leading tobacco type grown in Brazil. Flue-cured output in 1997 is expected to increase by more than 50,000 tons from last year, reaching over 368,000 tons. Burley output is forecast to increase by over 17,000 tons, reaching 87,000 tons. Brazil's leaf exports in 1997 are expected to total nearly 273,000 tons, up almost 9 percent from 1996. Brazil's export prices for the 1997 season are expected to be attractive to foreign buyers. The European Union and the United States are by far Brazil's leading leaf export markets. Other export markets for Brazilian leaf include Japan, the Philippines, and South American markets. In 1997, Brazil is expected to import about 7,000 tons of leaf tobacco, much of which is dark air-cured and dark sun-cured tobaccos. Suppliers of Brazil's leaf imports include the European Union, Argentina, and Zimbabwe.

Argentina:

Argentina's leaf output is forecast to reach 123,000 tons in 1997, an increase of over 25 percent from 1996. Production of flue-cured tobacco, the leading type grown in Argentina, is expected to jump 24 percent to 73,000 tons, while burley output should increase 40 percent to almost 38,000 tons. Total leaf plantings are expected to increase 15 percent in 1997 due to higher grower returns last year and an expected strengthening in the foreign demand for

Argentine leaf due to favorable prices. Argentina is expected to export 60,000 tons of unmanufactured tobacco in 1997, up about 25 percent from the 48,000 tons exported in 1996. Flue-cured tobacco is the leading tobacco type exported and is likely to reach 40,000 tons this year, 25 percent more than in 1996. Burley exports are expected to reach 15,000 tons this year, an increase of 36 percent over 1996. Argentina's leading export markets for leaf tobacco are the European Union, the United States, Brazil, Japan, and Venezuela. Argentina is not a significant leaf importer. For 1997, imports are expected to total 3,000 tons, down nearly 52 percent from last year due to increased production levels in 1997.

China:

China's tobacco production is forecast to reach nearly 2.6 million tons in 1997, up 50,000 tons from 1996. Flue-cured tobacco accounts for over 90 percent of China's leaf output. The tobacco monopoly's policy of discouraging the production of lower quality tobacco is still in effect. This includes the use of procurement prices and other incentives to influence the market and help relocate tobacco production to more desired locations, including efforts to move tobacco out of the fertile Yellow River Valley provinces. Nearly 90 percent of China's leaf output is destined to the domestic cigarette market.

Although several official Chinese sources have reported a rise in anti-smoking activities and a subsequent decline in smoking, other reports from Beijing and Shanghai, do not support this. In Beijing, 60 percent of males between the ages of 20 and 40 smoke. Cigarette production is projected to increase approximately 2 percent in 1997.

China has come onto the scene in recent years as a significant leaf tobacco exporting nation. However, after rising to nearly 74,000 tons in 1994, exports have fallen off. However, for 1997 China's leaf exports are expected to be up about 3 percent, totaling 60,000 tons. China's leaf imports are expected to be down over 28 percent in 1997, to 15,000 tons. Nearly all of China's imports are flue-cured type tobaccos supplied out of Zimbabwe.

Mexico:

Total unmanufactured tobacco output in 1997 is expected to reach about 49,000 tons, up slightly from 1996, and about 8 percent higher than in 1995. The Mexican tobacco industry is expected to rebound slightly as Mexico's economy shows signs of improving. The domestic cigarette market is likely to show moderate growth in the short-term which is expected to push the demand for leaf by domestic cigarette manufacturers higher in 1997. Production of burley tobacco, the leading type grown in Mexico, is expected to total over 27,000 tons in 1997, up from 26,500 tons last year. Flue-cured production is projected to reach 8,200 tons this year, up slightly from 1996. Mexico's leaf exports, which are nearly all burley type tobaccos, are forecast to remain at 13,000 tons in 1997, about the same level as in 1996. Leaf exports improved in 1996 as the Mexican peso devaluation late in 1994 kept Mexican leaf competitive on the international market. The United States is by far Mexico's leading export market for

burley tobacco. Mexico's leaf imports are projected to total about 3,000 tons in 1997, unchanged from 1996. The relatively low level of imports can be attributed to ample domestic supplies of sufficient quality tobaccos for domestic use.

Zimbabwe:

Zimbabwe's flue-cured production has steadily increased since 1994 and is again expected to increase in 1997. Output this year is forecast at over 235,000 tons, up almost 17 percent from 1996 when 201,550 tons were produced. Summer rains were abundant last year and resulted in what is expected to be ample water for irrigation throughout the 1997 growing season. A good quality crop last year, coupled with a tighter world supply situation pushed prices higher in 1996. This is expected to provide a strong incentive to growers to increase plantings this year.

Zimbabwe's burley output dropped almost 40 percent in 1996 to 6,175 tons, but is expected to rebound in 1997 to almost 8,000 tons. Much of the decline last year was due to poor prices, the lack of a local auction, and difficulty getting seed in time for planting. However, a new auction has opened in northern Zimbabwe and should provide better marketing opportunities for burley farmers. Additionally, a "seedbed scheme" developed to encourage planting of burley will be expanded for the 1997 marketing year.

Malawi

Exports are the lifeblood to Malawi's tobacco industry with over 95 percent of the tobacco crop going into the export market, and nearly 70 percent of the country's foreign earnings generated by tobacco trade. Burley accounts for over 80 percent of Malawi's leaf production. For 1997, Malawi's burley output is expected to reach 135,000 metric tons, up 14 percent from 1996, and 33 percent more than in 1995. Malawi's burley exports are expected to reach about 90,000 tons this year, up 10 percent from 1996. In addition to improved export prospects, much of the rise in Malawi's leaf output this year is a direct result of increased tobacco production by the smallholder growers. Prior to 1991, only estates, which are classified as production units of at least 10 hectares in size, were allowed to produce burley and flue-cured tobaccos. However, this policy has been largely eliminated and smallholders, which tend to be the poorer growers, are now permitted to produce these types. Other leaf types grown include flue-cured, oriental, and dark tobacco types. For 1997, Malawi's flue-cured production is expected to reach about 20,000 tons, about 5,000 tons more than in 1996, while dark leaf output should reach about 9,000 tons, up from 8,300 tons last year. Flue-cured exports should come in at almost 15,000 tons, and dark leaf exports of about 9,000 tons are expected. The leading export markets for Malawi's leaf include Europe, Asia and the United States.

Turkey

Although there has not been a change in the Government of Turkey's policy to limit oriental tobacco production in order to resolve the costly problem of overproduction and high stocks, output of oriental tobacco is expected to increase 7 percent in 1997, totaling 235,000.

Turkey's oriental output represents about 96 percent of the country's total leaf production. Flue-cured output in 1997 is expected to increase about 12 percent to 6,000 tons, while burley should reach 1,700 tons, unchanged from 1996. Turkey's exports of oriental leaf tobacco plays a vital role to the leaf industry. Oriental exports are expected to reach 120,000 tons in 1997, down about 8 percent from 1996. Although higher oriental production in competing countries is expected to push Turkey's exports down slightly this year, it is expected that Turkey's oriental trade will remain strong due to export price liberalization, and reduced availability of good quality oriental tobaccos in other producing countries. Until 1994, the United States was Turkey's sole supplier of non-oriental tobacco, used mostly to produce "TEKEL-2000" and "TEKEL-2000" Lights. However, there is an increasing incentive to import lower priced flue-cured tobaccos from non-U.S. sources for use in the new "value brands". High inflation and the devaluation of the Turkish lira have reduced consumers' purchasing power and led to an increase in the market share of medium and lower priced brands.

LIVESTOCK AND POULTRY OUTLOOK

by

James E. Nix ¹
Livestock Analyst
World Agricultural Outlook Board, USDA

The livestock and poultry industries have seen significant changes during the 1990's. One of the areas where change is taking place is in international trade. Beef, pork, broiler and turkey exports have advanced sharply during this decade. Compared with 1990, exports in 1996 were up 85, 280, 296 and 720 percent for beef, pork, broilers and turkeys, respectively. This strong growth in exports has helped boost domestic prices, but at the same time it has made prices more sensitive to developments in a number of foreign countries.

Another change underway is the rapid movement of hogs to larger operations and shifts in the production regions. The hog industry has moved toward more contract operations in recent years and most of these operations are outside the traditional hog producing region. This transition to large operations has not been without problems. It has met with resistance in some areas because some feel that it puts the "family farm" in an untenable position for survival. Also, in most areas large operations are being criticized for pollution of the environment.

The 1990's has also been a period of uncertain feed supplies and wide swings in feed prices. We have seen major floods and major droughts, as well as periods of ideal growing conditions. Both the cattle and hog breeding inventories were already being reduced in 1995 because of poor producer returns in late 1994 and 1995. The sharp rise in feed prices in 1996 exacerbated the situation and contributed to a sharp reduction in breeding inventories during 1996.

In many respects, U.S. livestock and poultry industries are at a crossroads. It is hard to argue against a continued upward movement in broiler production during the next several years. Pork production probably will rise sharply in 1998 after wallowing along this year at about the 1996 level. Sharp drops in beef output are likely next year following the downturn in cattle inventories we are now seeing. Just how well the beef industry reclaims market share following this downturn of the cattle cycle will be a pivotal point for all of these industries as we enter the next century.

Production

Current prospects point to record large total meat production continuing for the next few years. U.S. total meat output in 1996 was up nearly 2 percent from the year-earlier level and about 21 percent above the 1990 level. Meat production in 1997 is expected to increase about 2 percent from 1996's level as larger poultry output more than offsets a slight decline in beef and pork production. The drop in beef output will result from less cow beef as fed beef

¹Forecasts presented in this paper are the product of USDA's Meat Animals and Poultry Interagency Commodity Estimates Committees. These forecasts may differ from those in USDA's Baseline forecasts that are also being presented at this Forum. Differences occur because of new data since the Baseline forecasts were prepared.

output will increase. Total meat output in 1998 and 1999 will continue to increase with larger pork and poultry production more than offsetting smaller beef output.

Cattle Inventory On The Way Down

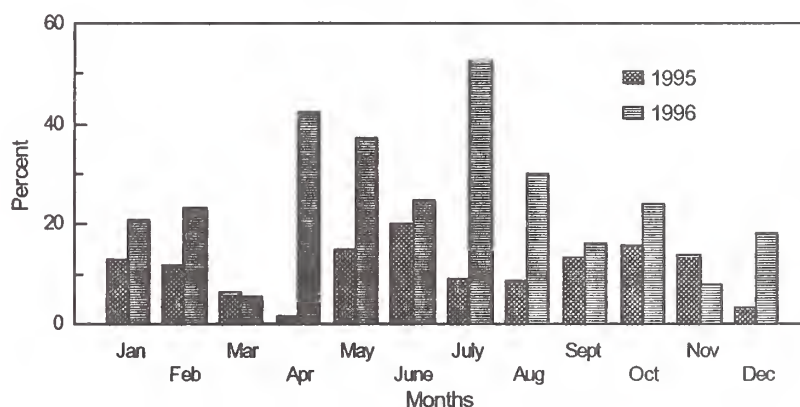
The cattle inventory has peaked for this cycle and is now declining. The U.S. inventory of all cattle and calves totaled about 103.5 million head at the beginning of 1996, up 0.7 percent from the previous year and the largest inventory since 1986. The cow inventory on January 1, 1996 was at about the same level as a year earlier. Producers were trimming herds in 1995 in response to weakening feeder cattle prices and poor returns. Then in 1996, rising feed prices put additional downward pressure on feeder cattle prices, sharply reducing producer returns. Further compounding the hardship, drought hit some of the major cow-producing areas leaving many producers with no option other than to sharply reduce numbers.

Beef cow slaughter rose sharply from the year-earlier level during the spring and for all of 1996 slaughter was up 24 percent from a year earlier. Cow slaughter is expected to stay at relative high levels through this winter then drop below the high levels of a year ago in the spring as new forage supplies develop. For all of 1997, cow slaughter will be down from the 1996 level and a further decline is likely in 1998.

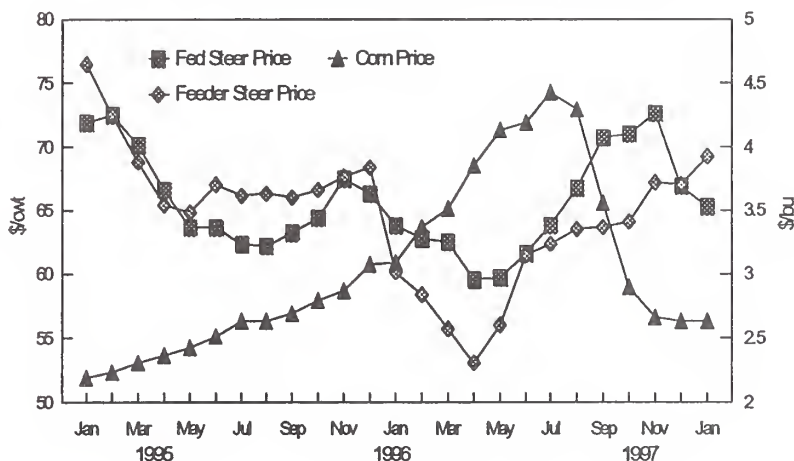
Feeder cattle prices dropped to low levels in the first half of 1996 as fed cattle prices weakened, corn prices shot up, and forage supplies dwindled. Severe drought in some areas pushed feeder cattle prices in local markets to extremely low levels. The recovery in feeder cattle prices in late summer-early fall 1996 lagged the recovery in fed cattle prices. Feeder cattle prices continued to recover in late 1996, and further recovery is expected as we move through 1997, particularly if grazing conditions are favorable and prospects are good for large 1997 corn and hay crops. The January 1, 1997 beef cow inventory of 34.280 million was down 2.7 percent from the year-earlier level. At the beginning of this year, producers were holding 2.1 percent fewer beef

Beef Cow Slaughter

change from previous year



Fed Steer, Feeder Steer and Corn Prices

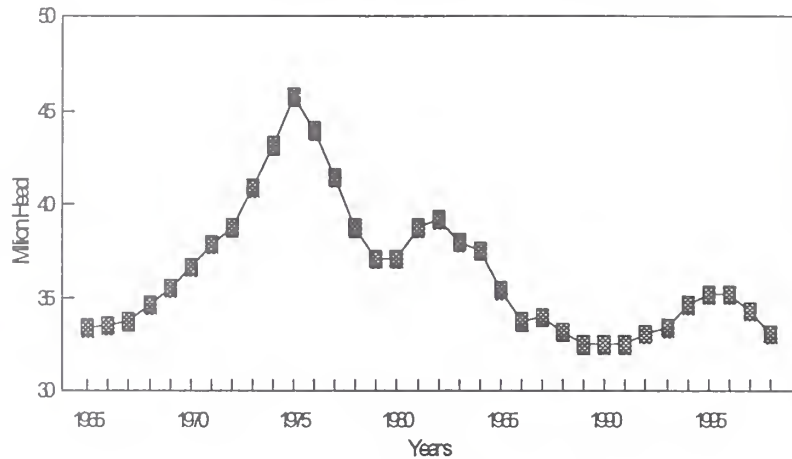


replacement heifers than a year earlier and 6.5 percent fewer than 2 years ago, suggesting further declines in the cow herd. The January 1, 1998 beef cow inventory may be down around 4 percent from the year-earlier level.

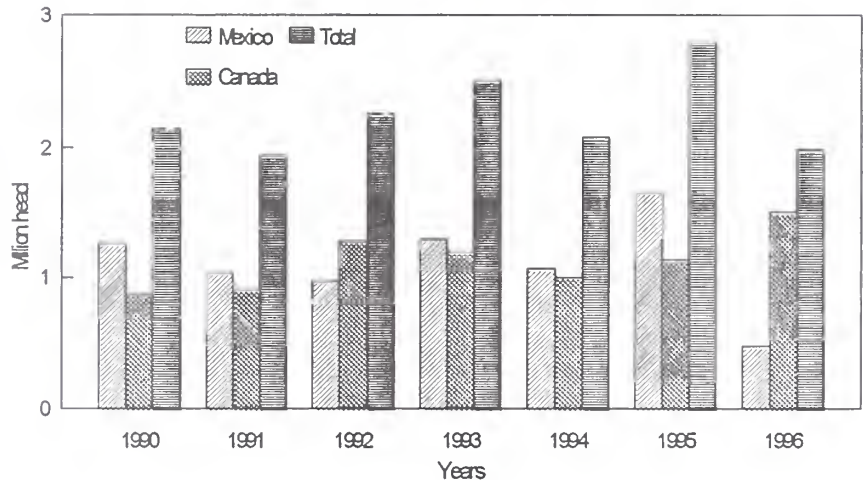
The 1996 calf crop of 39.586 million head is down 1.6 percent from the previous year. The reduced January 1, 1997 cow herd and fewer replacement heifers that were being held suggests that the 1997 calf crop will be down from the 1996 level, maybe by 4-6 percent. Improved conditions during 1997 likely will prompt producers to start retaining replacement heifers. However, it will be 1998 before we see much increase in the number of replacement heifers being added to the herd. As more of these heifers begin to calve, it should result in only a small decline in 1998's calf crop from the 1997 crop.

Calf slaughter in 1996 was 24 percent above the 1995 level and cattle slaughter was up 2.6 percent. Cattle imports in 1996 were down nearly 30 percent (more than 800,000 head) from the 1995 level. The reduction was the result of a sharp drop in feeder cattle imports from Mexico. Imports from Canada increased with most of the increase due to fed cattle being shipped to the United States for slaughter. The combination of a smaller calf crop (down 625,000), lower imports (down more than 800,000), and larger slaughter of calves (up 337,000) and cattle (up 936,000) resulted in a 2.2 percent decline in the total cattle and calf inventory on January 1, 1997. This puts us on the downside of the cattle cycle. Cattle slaughter in 1997 will be down a little from the 1996 level, and calf slaughter will drop sharply

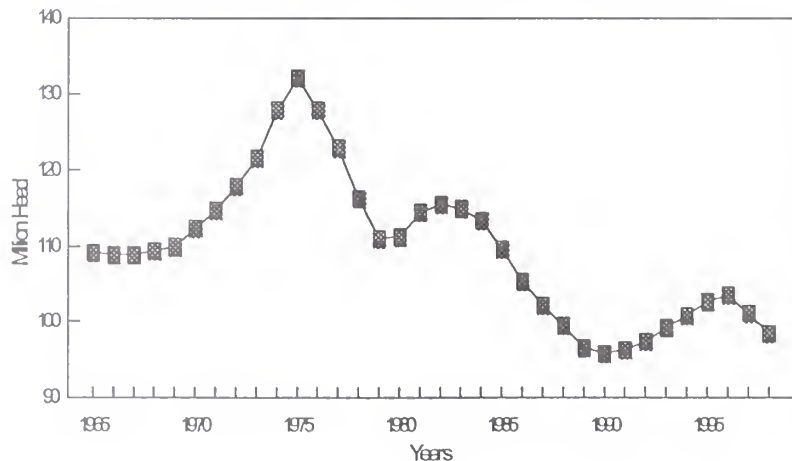
U.S. Inventory of Beef Cows



U.S. Cattle Imports



U.S. Inventory of All Cattle & Calves



from the high level of 1996. But the sharp decline anticipated for the 1997 calf crop will pull the inventory down further. The total cattle and calves inventory will slip lower in 1997 with the January 1, 1998 inventory registering a decline of around 3 percent. The inventory will continue to decline in 1998.

The severe winter storms in the Northern Plains will have an impact on the cattle inventory, but at this time the impact is not known. The impact on the national cattle herd will be minimal, but for local areas the impact may be severe. No doubt death losses will be larger than normal. There may also be an impact on this year's calf crop as well as next year's. Some reports have indicated that cows are aborting calves this winter because of stress and lack of feed. Some cows may fail to conceive this spring and summer and affect the 1998 calf crop.

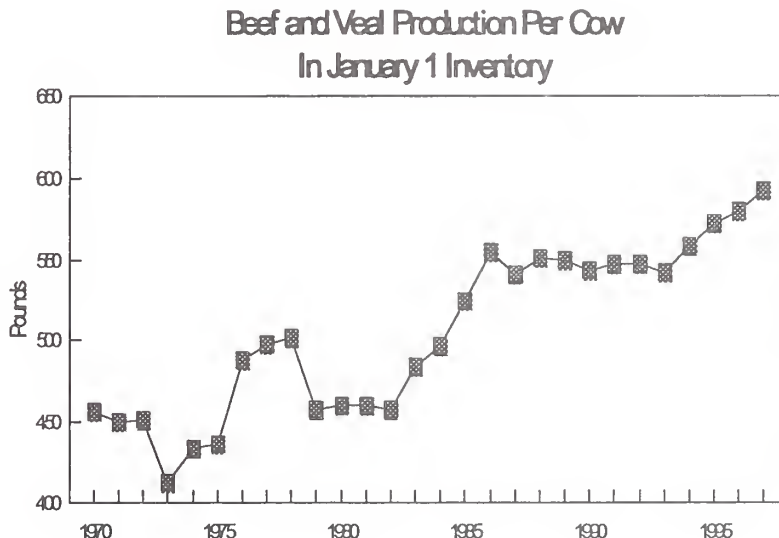
Feeder Cattle Supplies Tighten

Feeder cattle supplies have tightened. Supplies were plentiful this past summer as a result of the sharp decline in feedlot placements in the first half of 1996, but as placements picked up in the summer, supplies started to tighten. The smaller 1996 calf crop, sharply higher calf slaughter, and much smaller feeder cattle imports from Mexico all contributed to the tighter supplies. On January 1, 1997, the supply of feeder cattle outside of feedlots was down 3.6 percent from a year ago.

Feeder cattle supplies will tighten further in 1997, primarily because of the smaller calf crop that is expected for 1997. The movement of cattle into feedlots early in the year probably will continue at a relatively rapid rate. In many instances, conditions this winter favor cattle in feedlots over trying to carry them on forages. This will mean that a relatively large share of the steers and heifers will be in feedlots as spring approaches. Another factor limiting feeder cattle supplies in 1997 will be imports from Mexico. The Mexican cattle inventory has been reduced sharply leaving fewer animals available for shipment to the United States than they had in 1995. The financial position of cattle producers in Mexico has improved and they also have better forage supplies than in recent years when they were plagued by drought. Thus, they are likely to keep more of their animals at home rather than export them. The feeder cattle supply will continue to tighten in 1998 as the calf crop slips from the 1997 level.

Beef Production Per Cow Trending Upward

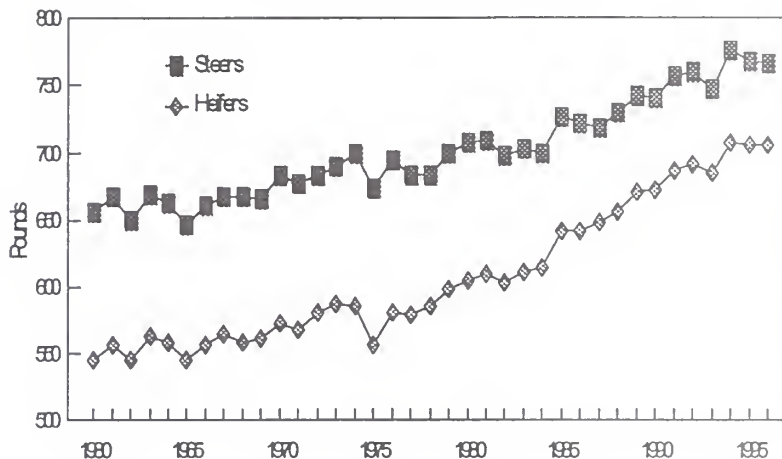
The pounds of beef produced per cow in the inventory at the beginning of the year is trending upward. The long-term trend in the number of cows has been down since the mid 1970's, but the increase in beef produced per cow has helped offset the impact of fewer cows. Several factors figure into this increase in beef produced per cow. The major factor has been an increase in the average weight of cattle slaughtered. Slaughter weight of steers in 1996 was around 100 pounds per animal heavier than they were in 1970. Heifer weights increased even more, rising about 135



pounds during this period. A shift to heavier breed cattle has been the major factor in this movement to heavier dressed weights.

Another factor contributing to more beef being produced per cow has been a general downward trend in calf slaughter. Instead of slaughtering light weight calves, a higher percent of the animals are now kept on grass and feedlot rations and produce more beef per animal than was the case 10 to 20 years ago. The number of steers and heifers (excluding calves) slaughtered per cow is trending upward. In 1950, the number of steers and heifers slaughtered per cow in inventory at the beginning of the year was only 0.30 head. This rose to 0.58 in 1970, to 0.63 in 1990 and 0.64 last year.

Average Dressed Weights

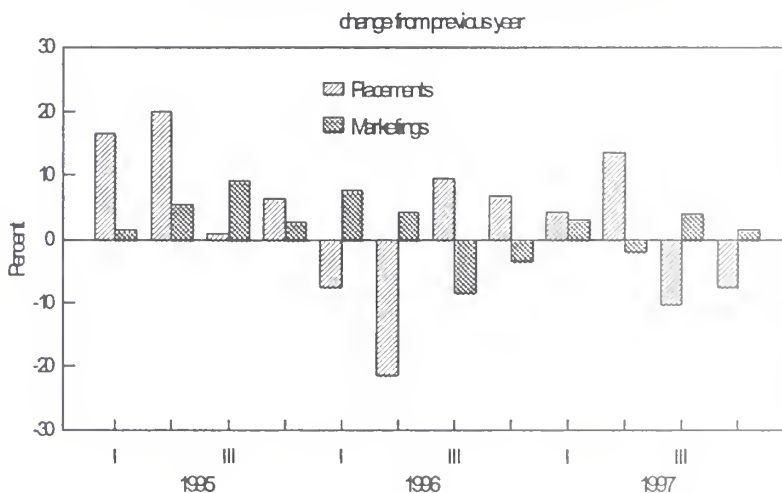


Average weights will probably continue to trend upward for at least the next several years. Changes in the breed composition of the national cattle herd are a rather slow process, so the shift to heavier breeds that has been taking place will continue for some time. Herd rebuilding following the current downturn in cattle numbers will have a major influence on the type of beef cow herd that will be in place for years to come. If a major part of the rebuilding comes from the heavy breeds of cattle, we will continue to see average weights climb well into the next century.

Beef Production Poised For A Decline

High feed prices and weak fed cattle prices in the first half of 1996 resulted in a sharp reduction in placements of cattle on feed. First quarter placements declined 7 percent, and second quarter placements dropped to almost 22 percent below the year-earlier level. This sharp drop in placements resulted in a decline in fed cattle slaughter during the summer and early fall. The lower fed cattle supplies during the summer reduced beef output and contributed to a recovery in fed cattle prices and improved returns to the cattle feeding enterprise. Movement of cattle into feedlots began to increase with placements in August registering a 20 percent increase. Declining corn prices also contributed to the recovery in cattle feeding. Year-over-year gains in placements occurred through November. December placements were down 2 percent. The number of cattle on feed at the beginning of 1997 was up 3 percent from a year ago. Placements in the

Fed Cattle Placements & Marketings



first half of 1997 will be above the low level of a year earlier. Placements in January 1997 were 25 percent above the year-earlier level. However, due to tightening feeder cattle supplies, placements in the second half of the year will decline. Placements in 1998 will continue to be constrained by tight feeder cattle supplies.

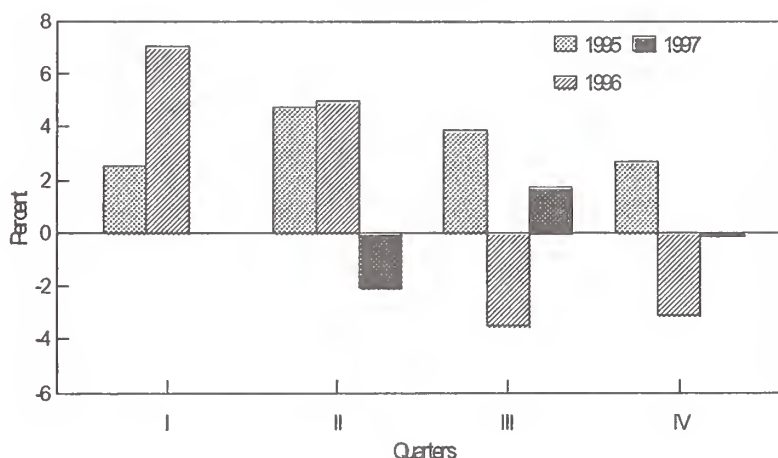
Fed cattle marketings have recovered as the large number of cattle that went into feedlots during the last half of 1996 are being sold. Marketings will remain at a high level through the winter. Marketings in the last half of 1997 should exceed the reduced marketings of the last half of 1996, but will be down from the second-half 1995 level. Fed cattle marketings in 1998 will slip from the 1997 level.

Sharply higher cow slaughter in 1996 boosted beef output. In 1997, cow slaughter will remain at relatively high levels through the winter then drop sharply in the spring. The reduced slaughter in 1997 will help hold down beef production. A further decline in cow slaughter in 1998 will contribute to a drop in beef production, and relatively tight domestic supplies of cow beef.

Beef production in 1996 was up a little over 1 percent from the previous year, but all of the gain came in the first half of the year when output was very large, up 6 percent from the previous year. Second-half 1996 production was down more than 3 percent from a year earlier. Beef production in 1997 is expected to be little changed from the 1996 level, but a higher percentage of the output will come from fed beef as slaughter of feedlot cattle increases and cow slaughter drops sharply. Beef production will decline in 1998 with both fed beef output and cow beef production falling. A 4 to 5 percent drop is likely. Further declines in output are likely in 1999.

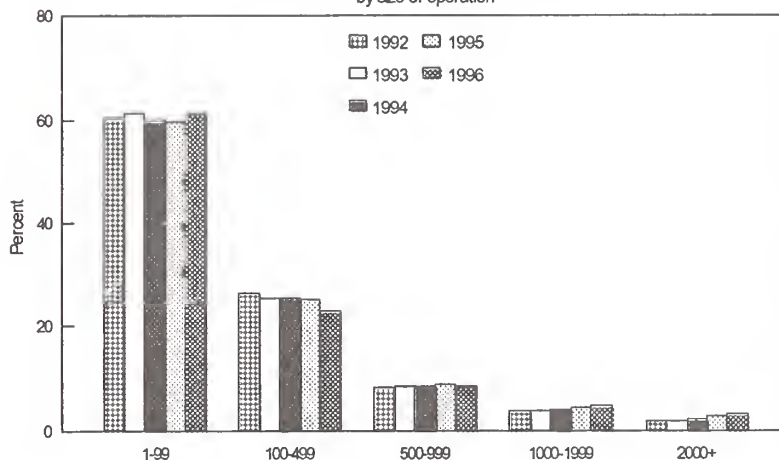
Beef Production

change from previous year



Distribution of Hog Operations

by size of operation



Fewer But Larger Hog Operations To Continue

The number of operations with hogs in the United States has been on a steady downward trend for many years. Based on data from NASS/USDA, in 1996 there were 157,450 operations that had hogs, down 13 percent from the number in 1995 and 41 percent fewer than in 1990. The decline has come in the smaller size operations with the number of large operations

increasing. In 1996, only 4,880 operations had 2,000 or more hogs, 3.1 percent of all operations. At the other end of the scale, 61 percent (96,000 operations) had less than 100 head.

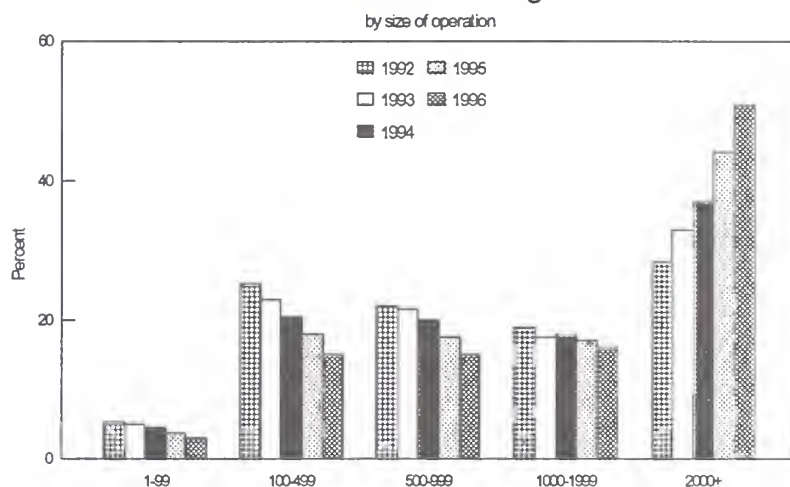
As the number of operations with hogs has declined the average size of operation has increased significantly. In 1996, 51 percent of the hogs were on operations with 2,000 or more hogs compared with 28.5 percent in 1992. The smallest operations, those with less than 100 hogs, held only 3 percent of the inventory in 1996. There does not seem to be anything in the near future that will change the trend to fewer and larger operations.

There has also been a shift taking place in the regions of production. On December 1, 1996, the number of hogs in the "traditional hog-producing states in the Corn Belt" were down 9, 2, 8, 6, 17, and 1 percent in Iowa, Minnesota, Illinois, Indiana, Ohio, and Missouri, respectively. States showing increases included North Carolina, Kansas, Oklahoma, Colorado, Wyoming, Utah, and Arizona where inventories increased 13, 18, 32, 9, 12, 163, and 20 percent, respectively. With the exception of North Carolina, the increases for the other states are from a low level compared with the inventories in the Corn Belt states. Nevertheless, it indicates that there is a growing presence of hog production outside the traditional production region. A comparison of the numbers in a few states on December 1, 1990 and December 1, 1996 shows some of these shifts. In 1990, Iowa had 25.4 percent of the inventory, and North Carolina had only 5.1 percent. On December 1, 1996, North Carolina had 16.6 percent of the inventory, and Iowa had 21.7 percent.

U.S. Inventory of Hogs Kept For Breeding Down

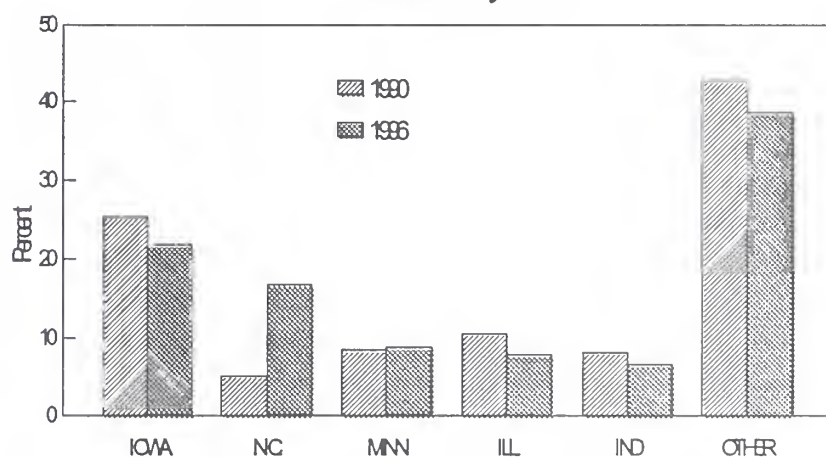
Low hog prices in 1994, particularly the very low prices during the autumn, prompted hog producers to start pulling back on the breeding herd. Sow slaughter during September - November 1994 was up 12 percent from the previous year. Sow slaughter continued at a high level during December 1994 - February 1995, increasing 10 percent from the year-earlier level. Slaughter during March - August 1995 was little changed from the previous year. The June 1, 1995 breeding inventory was down 5 percent from the year-earlier level. The breeding inventory continued to decline, and on September 1, 1995 it was down 7 percent.

Distribution of Hogs



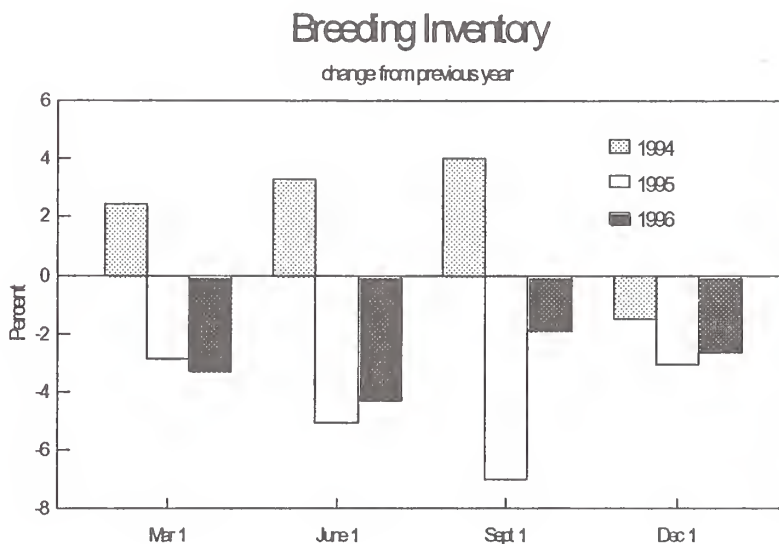
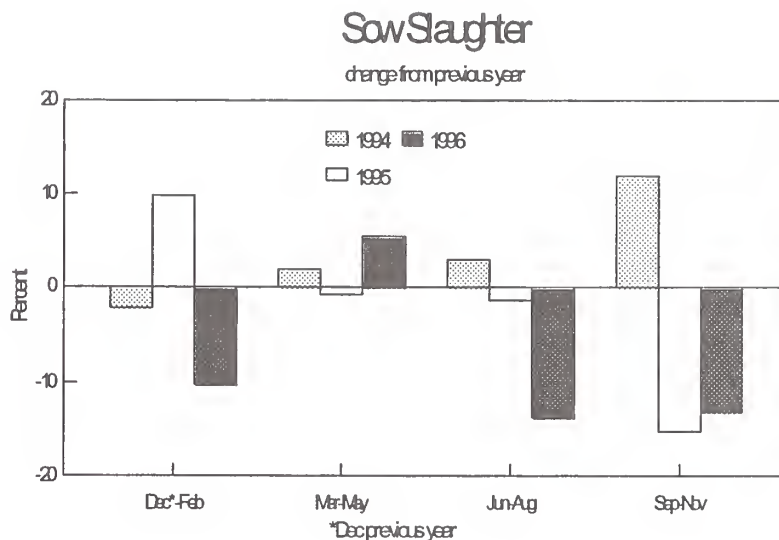
December 1 Hogs and Pigs Inventory

Distribution by State



Hog prices rebounded strongly in the summer of 1995, but weakened seasonally in the fourth quarter. Adding to the woes of hog producers during this period was rising grain prices that increased as prospects for a poor corn harvest materialized. This further squeezed many producers and they continued to cut back on breeding herds. Sow slaughter during September - November 1995, however, dropped over 15 percent from the high level of a year earlier. Hog prices in 1996 increased and largely offset the high feed costs, providing many producers with returns that at least covered their cash costs. Sow slaughter during December 1995 - February 1996 was down more than 10 percent from a year earlier. Sow slaughter during the spring was up about 5 percent, but in the last half of 1996 it was down more than 13 percent. Sow slaughter as a percent of total hog slaughter was at a record low level during the last half of 1996. It was the large decline in sow slaughter during the last half of 1996 that prompted most analysts to forecast an increase in the December 1, 1996 hog breeding inventory. Producers, however, were not adding gilts to the herd. In fact, during September - November 1996

there was a very sharp reduction in the number of gilts added to the herd. The December 1, 1996 inventory of hogs kept for breeding was down nearly 3 percent from the previous year.

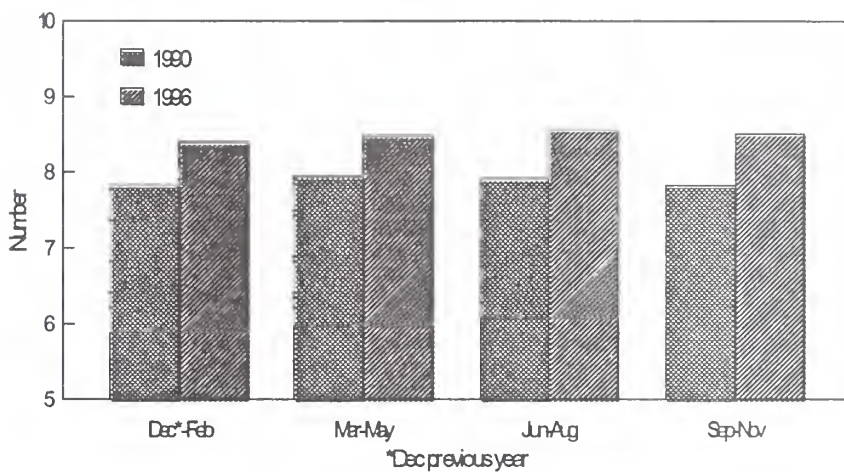


Pigs have already been born, or breeding decisions that will produce pigs for most of the slaughter in 1997 have already been made. At the time the December 1996 *Hogs and Pigs* report was released, only a couple of months remained to breed sows that would produce pigs for slaughter during 1997. Based on data in the December *Hogs and Pigs* report, pork production is expected to stay at levels that will give producers good returns in 1997. A few more sows may be bred than was included in the farrowing intentions, but this would only impact on production late in 1997. The good returns for 1997 should prompt a sharp expansion in the breeding inventory during the year and set the stage for increased sow farrowings in the last half of 1997 and the following year.

Pigs Per Litter To Continue Increasing

The number of pigs per litter has been increasing, and indications are that this upward trend will continue, at least during the next several years. In 1996, the number of pigs per litter was up about 8 percent from the 1990 level. Helping to push the number of pigs per litter higher has been the larger hog operations. In the December 1996 *Hogs and Pigs* report, the average number of pigs per litter on operations with less than 100 hogs was 7.3 compared with 8.8 for operations with 2,000 or more hogs. The number of pigs per litter on all size operations is probably increasing, but the shift to large operations that save more pigs per litter just amplifies the increase.

Pigs Per Litter

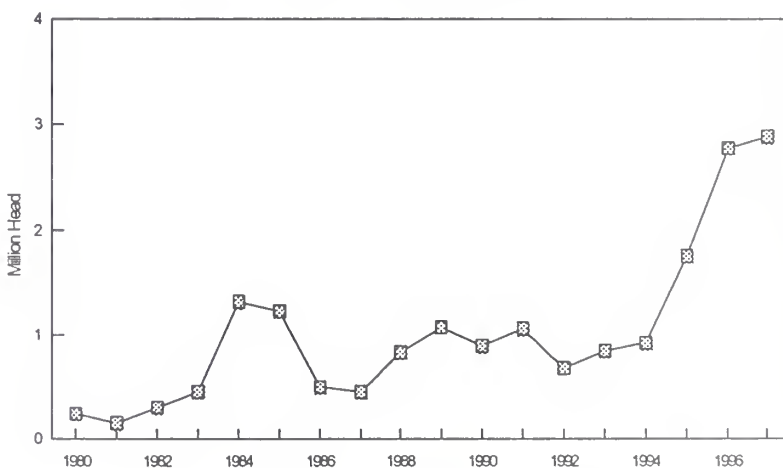


Pork Production Poised For An Increase

Pork production in 1996 was down about 4 percent from the previous year. Production would have fallen even more had it not been for a sharp increase in the number of hogs imported from Canada.

Data from the December 1996 *Hogs and Pigs* report suggest that output in 1997 will be little changed from the 1996 level. The December 1, 1996 market hog inventory and June through November pig crops suggest that first-half 1997 production will be down about 2 percent.

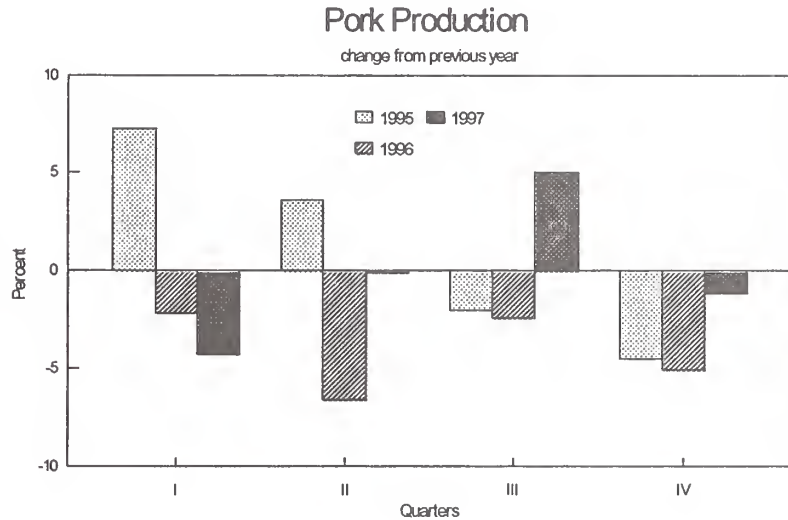
U.S. Live Hog Imports



Farrowing intentions and expectations on pigs per litter suggest a somewhat abnormal pattern for second-half 1997 production. The December 1996 - February 1997 farrowing intentions were for farrowings to increase 1 percent from the year-earlier level. This, combined with an increase in pigs per litter, would result in about a 3 percent increase in the pig crop. The December - February pig crop supplies most of the hogs for slaughter in the summer quarter. The last 2 years, July - September hog slaughter as a percent of the December - February pig crop was a little below average. So, with about a 3 percent larger pig crop and a return to a more normal relationship between pig crops and

slaughter, hog slaughter during July - September is forecast to increase over 4 percent. With slightly heavier weights this summer, pork production could increase about 5 percent.

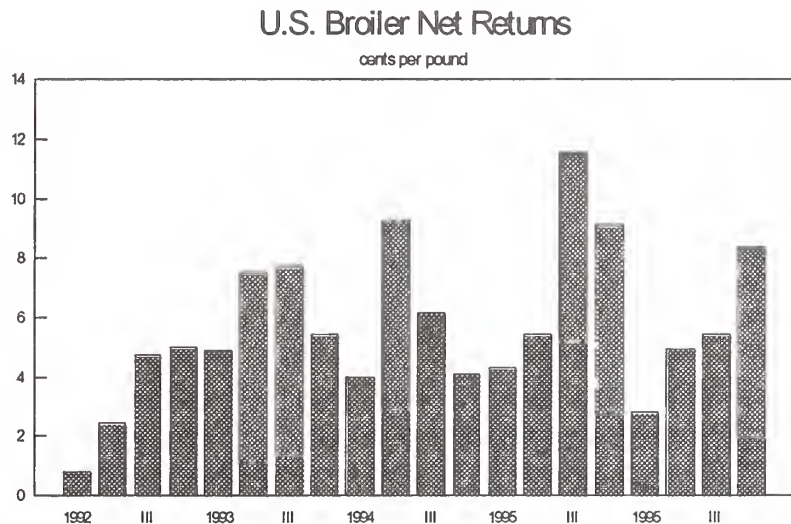
Farrowing intentions for March - May 1996 were for a 2.4 percent decrease from the previous year. After factoring in an increase in pigs per litter, this still leaves us with a smaller March - May pig crop than we had in 1996. Pigs born during this period supply most of the hogs for October - December slaughter. This suggests that slaughter during October - December 1997 will be little changed from the third quarter level and down a little from the previous year. If commercial hog slaughter during October - December 1997 does not increase from the July - September 1997 level, it would be the first time there has not been a seasonal increase in slaughter from the third to the fourth quarters in at least the last 50 years.



The level of pork production indicated here suggests that hog prices should be favorable for producers in 1997. This, combined with feed prices that are down from a year ago, should prompt the recovery in the breeding herd and farrowings previously discussed. Thus, pork production in 1998 is expected to increase substantially, maybe 6 to 8 percent. Increases likely will continue into 1999, but the rate of increase will moderate from the 1998 pace.

Broiler Producers Had A Year Of Good Net Returns

Despite high feed costs, broiler producers had good net returns in 1996. Broiler prices rose to levels that more than offset the higher feed costs during most months of 1996. March was the only month showing a negative return in USDA's costs and returns data. For the year, net returns averaged over 5 cents per pound. With feed costs declining in 1997, returns should remain positive. Costs of production dropped into the low 50 cents per pound range for the first 2 months of 1997, and broiler prices were still above 60 cents per pound in early February.



Broiler Hatchery Supply Flock Expected To Increase

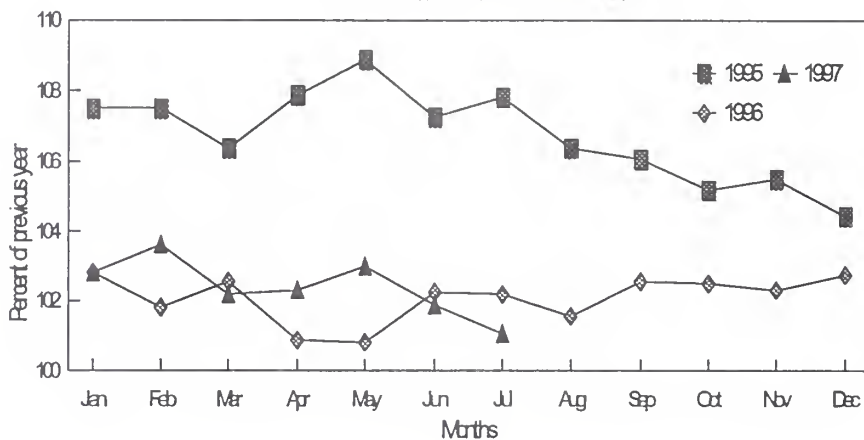
The broiler hatchery supply flock provides a barometer of future broiler production, but this is only a crude indicator. In 1995, the flock was generally up 5 to 8 percent from the previous year, and slaughter for the year was up only a little more than 4 percent. Last year, broiler slaughter increased about 2 percent when the size of the flock fluctuated around 2 percent larger than the previous year. The flock will be up 2-3 percent from a year earlier during the first half of 1997. Monthly placements in 1996 were generally above the 1995 level, but during November and December placements were down from the year-earlier level. With the positive net returns producers saw in 1996 and with feed costs coming down and broiler prices staying favorable in 1997, producers likely will step up the number of pullets being added to the hatchery supply flock from the late 1996 levels. This probably will result in the hatchery supply flock showing a larger year-over-year increase in the second half of 1997.

If the flock grows as expected, it will place the industry in a strong position to increase production in 1998 when beef supplies are expected to decline sharply. Competition from pork will be stronger in 1998, but the tighter beef supplies enhances the probability that the industry likely will expand output.

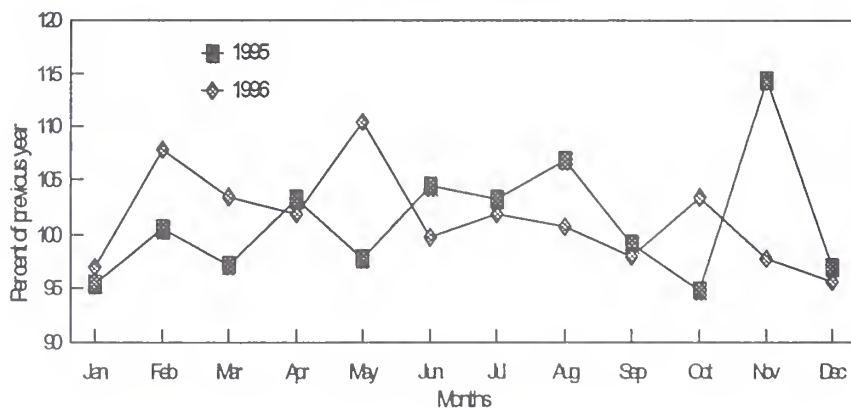
Continued Increases In Broiler Production Likely

Broiler production increases of at least 5 percent have become the norm. Helping to support these increases is heavier weight birds. In 1996, average weights were up 9.2 percent from 1990's level and were 20.8 percent heavier than in 1980 and 31.0 percent above the 1970 level. In 1996 when feed supplies were very tight and costs high, production increased over 5 percent. A little over half of last year's increase was due to heavier weights.

Broiler Hatchery Supply Flock
Placements 7-15 Month Earlier



Broiler Hatchery Supply Flock
Monthly Placements



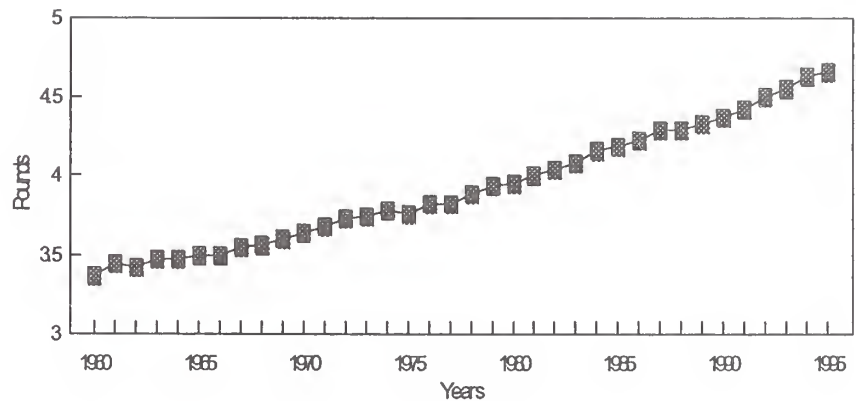
Hatchery data suggests that the increase in production during the early months of 1997 will be a little below the 5 percent mark. However, it is expected that production will begin to expand at a faster rate during the spring as the industry better utilizes the hatchery supply flock. The positive returns that producers continued to enjoy going into 1997 will prompt them to increase output, particularly as we move into the cookout season when demand normally increases seasonally. For all of 1997, production is forecast to increase around 6 percent.

At this point, prospects point to another strong increase in production in 1998. Pork production will be up, but the tighter beef supplies anticipated for 1998 bode well for increased broiler output. By 1999, pork production will have expanded to the point where it will offer strong competition for broilers. The increase in broiler output in 1999 probably will slow from the 1998 increase, but another drop in beef output should make it a relatively favorable year for broiler producers.

Poor Net Returns To Turkey Producers

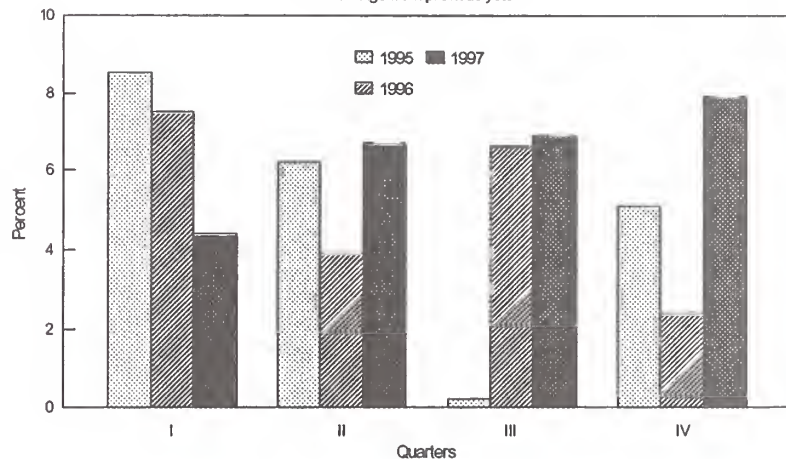
Turkey producers suffered a year of poor net returns in 1996 as feed costs increased sharply and turkey prices averaged near the year-earlier level. Returns were negative every month in 1996 with an annual loss of 6 cents per pound. Feed costs have declined, and in 1997 they are expected to average sharply below the 1996 level. Turkey prices should be up from the 1996 level, particularly in the last half of the year. This is expected to result in positive producer returns for 1997.

Broiler Average Liveweight At Slaughter



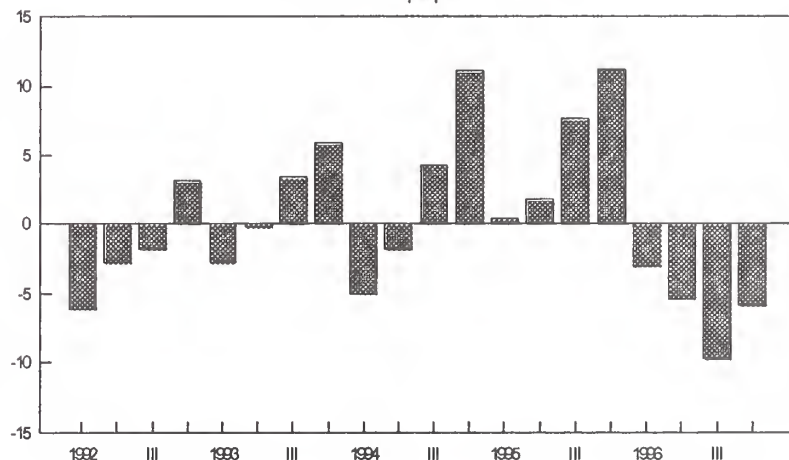
Broiler Production

change from previous year



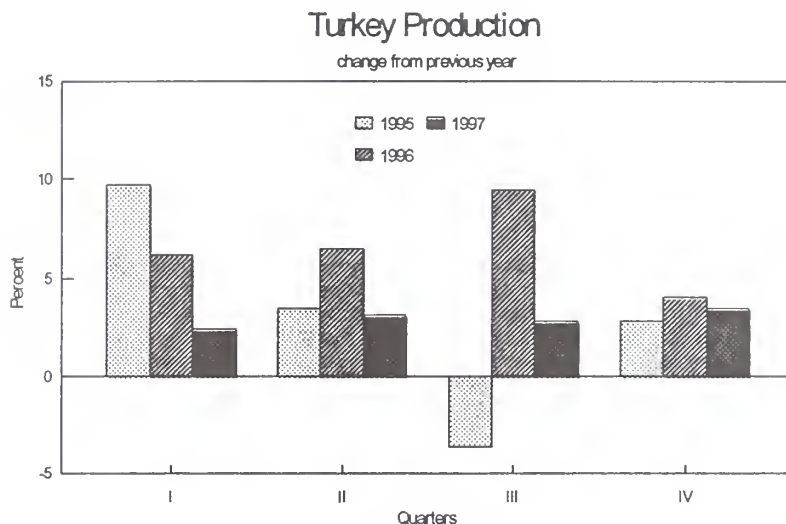
U.S. Turkey Net Returns

cents per pound



Turkey Production Forecast To Increase

Turkey production is expected to increase about 3 percent in 1997 following about a 6.5 percent rise in 1996. The substantial increase in production last year, the largest annual increase since 1990, helped hold turkey prices down even though broiler and hog prices increased. The poor returns that producers encountered in 1996 will hold down the increase in output this year. Improved returns in 1997 probably will result in increased output in 1998. But, expected sharp increases in pork output and lower pork prices likely will hold increases in turkey production to the 2-3 percent range. Competition will be even more intense in 1999, and the rise in turkey output likely will slow to 1 to 2 percent.



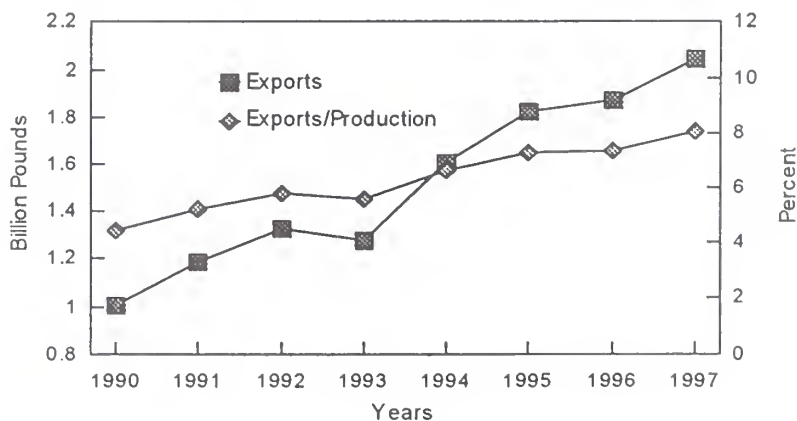
TRADE

During the 1990's, livestock and poultry industries have made major moves into the international market, and prices have become sensitive to changes in foreign markets. Not only must these industries be concerned with production and demand in other countries, they must also follow developments that might result in trade interruptions. In most cases, a few countries dominate the market for our exports or sources for our imports. On the other hand, U.S. industries must be concerned with providing safe and wholesome products.

Continued Growth In Beef Exports Expected

The United States is the premier supplier of high quality beef on the world market, and U.S. beef exports have been on a strong upward trend. Exports in 1996 were up 86 percent from 1990. A larger percentage of the production is also going into the export market. In 1996, exports were equal to about 7.4 percent of production compared with 4.4 percent in 1990. The export market is siphoning off more of the highest

Beef Exports and Exports as a % of Production



quality beef produced in the United States. As beef production declines the next few years, the percentage of beef going into foreign markets will increase even faster if export demand continues to grow as expected.

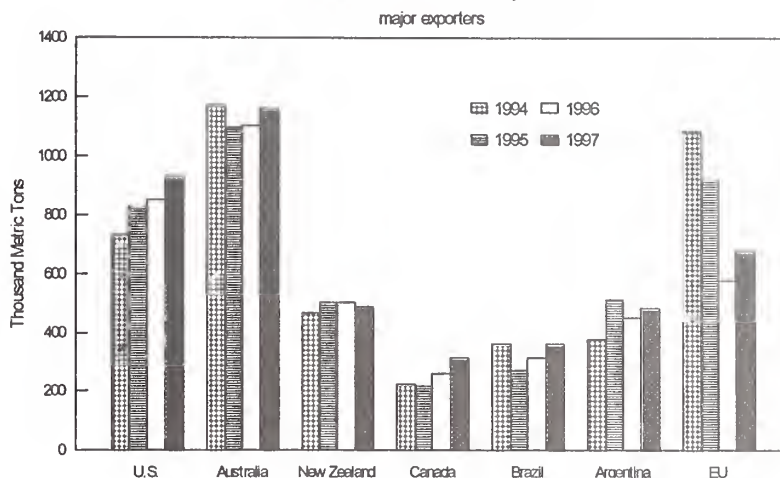
U.S. beef exports weakened in the second half of 1996 after posting strong increases in the first half of the year and in 1995. First-half exports were more than 20 percent above the year-earlier level and second-half exports dropped about 12 percent below the 1995 level. Exports remained weak as we moved into 1997, but a recovery is forecast later in the year. For all of 1997, beef exports are expected to increase nearly 10 percent from the 1996 level. Growth in demand for high quality beef in the major importing countries of the world, particularly the biggest customers for U.S. beef, are expected

to support the continued climb in beef exports. The United States is second only to Australia in terms of total beef exports, but Australia is not a large producer of high quality grain-fed beef. Other major exporters also do not produce and/or export large quantities of high quality grain-fed beef.

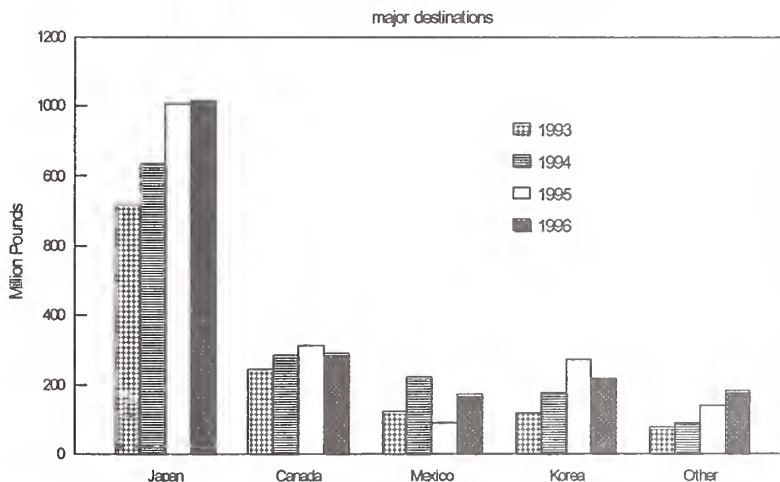
In 1996, two major developments slowed international beef trade and hurt U.S. beef exports. First, the “Mad Cow” (BSE) outbreak in Europe resulted in a worldwide consumer concern about the safety of beef. This concern most likely slowed beef trade and caused problems for traders in many countries that further compounded problems with beef trade. The second major development was the outbreak of E. coli in Japan. The E. coli was not traced to imported beef, but it did have an impact on beef consumption in Japan. For the United States, the impact of these two developments was strongly felt in Japan where consumers cutback on beef purchases.

Japan is the largest market for U.S. beef exports, taking about 55 percent of beef exports in 1996. U.S. beef exports to Japan slowed as consumers reacted to the concern over BSE and E. coli. Beef exports to Japan during the first half of 1996 increased 28 percent from the year-earlier level, but in the second half of the year they were down 9 percent.

Beef and Veal Exports



U.S. Beef and Veal Exports



Much work has been done in Japan to assure consumers of beef's safety. Expectations are that the adverse reaction to these two concerns will moderate and beef imports will begin to recover. However, another factor has emerged that is hurting beef exports to Japan. The decline in the yen relative to the U.S. dollar has made U.S. beef more expensive and slowed exports. While current beef prices on the U.S. market are down from late 1996 levels, the price for Japanese importers has not been as attractive. If the dollar stays strong relative to the yen this year as now seems likely, rising beef prices this year will make U.S. beef for Japanese importers much more expensive than in 1996.

Per capita beef consumption in Korea has been increasing at a fast pace. Estimated per capita consumption in 1996 was about 43 percent above the level just 5 years earlier. Supported by strong demand and market liberalization, beef imports have been increasing. U.S. exports to Korea were climbing, but last year they slipped about 20 percent from the high 1995 level. Exports in 1996 were still nearly a fourth above the 1994 level. Growth in demand in 1997 is expected to out pace an increase in production supporting larger beef imports. This should result in a continued good market for U.S. beef.

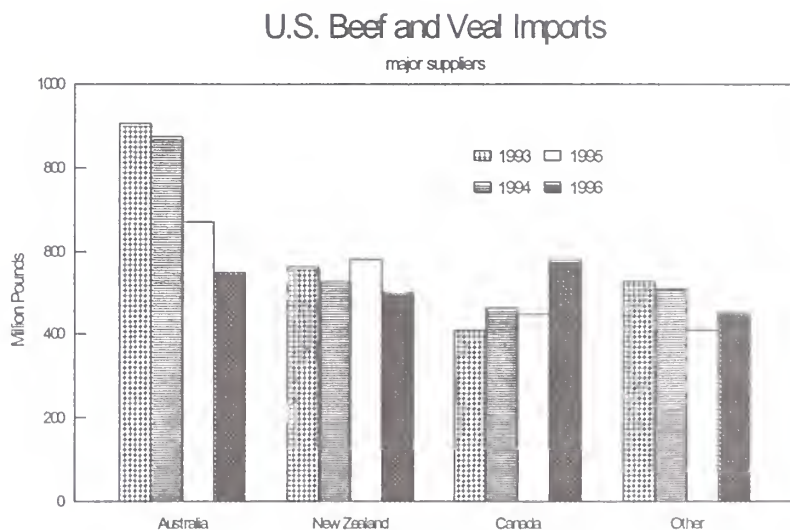
Mexico's economy is recovering from the very poor performance of 1995 following the devaluation of the peso in late 1994. The rebound in the economy is helping to support a recovery in U.S. beef exports to Mexico. Cattle herds in Mexico have been reduced by the poor economy and drought conditions that cut sharply into feed supplies. This is holding down domestic beef supplies and imports are increasing to supplement consumption. U.S. beef exports to Mexico rebounded in 1996, but they were still below the 1994 level. A further rise in exports to Mexico is expected in 1997.

U.S. beef exports to Canada, another of our major markets, were off in 1996. Beef production in Canada is showing strong increases, up around 10 percent in 1996, and another large increase is anticipated for 1997. Canada's total beef imports were down in 1996, and they probably will slip further in 1997. U.S. exports to Canada are also expected to be lower in 1997.

U.S. Beef Imports Likely To Increase

During the last few years, U.S. beef imports have declined. From 1990 through 1994, imports held around the 2.4 billion pounds level. Imports in 1995 were down 11 percent from the previous year and last year declined slightly. Declining U.S. cow beef supplies and weakness in the Japanese market likely will result in larger supplies entering the U.S. market in 1997.

The United States is primarily an importer of manufacturing grade and canned beef. In 1996, there were large supplies of this type of beef on world markets looking for a home. The weakness in the Japanese market caused by the BSE and E. coli concerns exacerbated the situation as Japan reduced its imports. Even though the United States had large domestic supplies of



manufacturing grade beef from the high level of cow slaughter and feedlot cattle that did not make the higher quality grades, the U.S. market was still the most attractive market available for many exporters. This helped hold U.S. beef imports at a relatively strong pace in 1996, thus the very small decline in imports last year.

Large supplies of manufacturing grade and canned beef are expected to be available on world markets again in 1997. Beef production in the world's largest beef exporter, Australia, is expected to increase in 1997. They will once again be looking for a home for their large exportable supplies. A recovery in the Japanese market will help Australia's export situation, but the recovery is not likely to be enough to keep larger supplies from being pushed into the relatively attractive U.S. market. These larger supplies will enter the U.S. market even as Australia ships more product to other markets it has been trying to develop.

Beef production in New Zealand, another major exporter of beef to the United States, is expected to decline in 1997. New Zealand's total beef exports in 1997 are forecast to slip from the 1996 level with the quantity shipped to the United States also expected to decline.

U.S. beef imports from Canada in 1996 were up from the previous year. Large increases in beef output in Canada have pushed their exportable supplies higher. This will be the case again in 1997 and shipments to the United States are likely to increase.

Beef production in Argentina decreased in 1996 while output in Brazil rose. This is likely to be the situation again in 1997. Neither of these countries can ship fresh or frozen beef to the United States because of past and/or present presence of foot and mouth disease. They can, however, ship canned beef to the United States. Both of these countries saw their total beef exports increase in 1996. Brazil shipped more beef to the United States than it did in 1995 while Argentina shipped less. Both of these countries are expected to increase their total beef exports in 1997, and the United States likely will be the recipient of a normal share of total exports. Argentina is pushing for recognition as a "clean market" (free of foot and mouth disease). If Argentina gets this recognition, it could change the trade picture for beef.

Strong Growth In Pork Exports To Continue

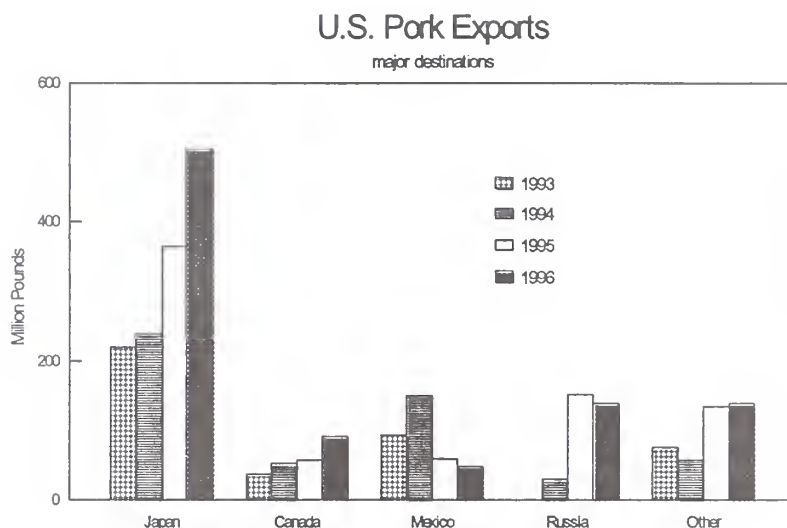
U.S. pork exports in 1996 were up about 20 percent from the previous year and 288 percent above the 1990 level. Another large increase in exports is forecast for 1997 with most of the increase occurring in the second half of the year. A larger share of U.S. pork moves into the export market each year. In 1996, pork exports were equal to about 5.4 percent of production, up from 1.6 percent in 1990. This year, exports may be equal to around 6.5 percent of production.

Japan is the major foreign customer for U.S. pork, taking about 55 percent of 1996's total pork exports. The

**Pork Exports and
Exports as a % of Production**



concern over the safety of beef probably helped boost pork sales in 1996. For the last several years, Japan has taken around one half of U.S. pork exports. Exports to Japan have also shown strong increases during the last several years, up nearly 40 percent last year. The WTO - sanctioned Safeguard (SG) mechanism that Japan uses to regulate pork imports has caused a large variation in monthly shipments of pork to Japan. Japan imposed the SG on July 1, 1996 and it probably will not be lifted this year until the beginning of July, three months later than our expectations a few months ago. Furthermore, it is likely that the SG will be imposed again this autumn. Pork production in Japan continues to slip, and Japan looks to imports to maintain their level of consumption. Per capita pork consumption on an annual basis has shown little change during the last several years. Exports to Japan are expected to increase in 1997, but the weaker yen will hold down the growth.



Russia has emerged as the second largest market for U.S. pork exports during the last couple of years. Last year about 15 percent of U.S. pork exports went to Russia. In the early 1990's, there were virtually no exports to Russia. The sharp drop in Russia's pork production in recent years has made this a good market for our exports. U.S. export assistance in 1994-95 helped kick start these exports. In 1996, pork production in Russia was only about 50 percent of the 1990 level. A further decline in production is forecast for 1997. Even with large increases in imports, per capita pork consumption in Russia is falling.

Canada and Mexico are traditional markets for U.S. pork, but they are much smaller markets than Japan and Russia. Exports to Canada have been on a general upward trend, but they account for less than 10 percent of total exports. Annual levels of shipments to Mexico have shown a lot of variability the last several years. They were increasing prior to the peso devaluation in late 1994, and declined sharply in 1995. They were off again last year, but they are expected to increase this year as the economic recovery helps boost demand.

Korea is another emerging market for U.S. pork. From a very low base, exports to Korea have been trending upward. Growing demand for pork in Korea is pushing imports higher even as domestic production holds at high levels. Trade liberalization is expected to result in a sharp jump in U.S. exports to Korea in 1997. This year, shipments to Korea could exceed those to either Mexico or Canada.

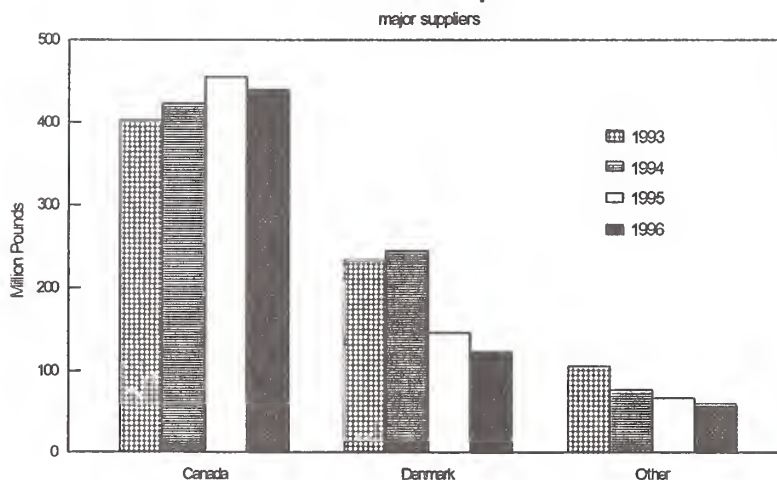
U.S. Pork Imports Slipping And Live Hog Imports Increasing

U.S. pork imports have been on a general downward trend for several years. In 1996, imports fell about 6.5 percent from the year-earlier level. A further decline is expected in 1997. Longer term, a slow downward trend in pork imports is expected. Canada and Denmark are the primary sources of our imported pork. Imports from Denmark have been declining sharply and these imports are accounting for a much smaller share of the total than a few years ago. In 1994, imports from Denmark accounted for about a third of total pork imports, but last year they made up

less than 20 percent. Canada, however, continues to ship large quantities to the United States. In 1996, over 70 percent of total pork imports came from Canada.

Live hog imports, virtually all of which come from Canada, have been increasing, and prospects point to another increase this year. In 1996, live hog imports totaled about 2.8 million head, an increase of nearly 60 percent from the 1995 level. Tight hog supplies in the United States during 1996, particularly on a regional basis, prompted this big increase in imports. Most of the hogs imported go directly to slaughter. In 1996, only about a fourth of the imports weighed less than 110 pounds. This year, prospects point to a continued tightness in the supply of hogs in these regions and live hog imports probably will increase again.

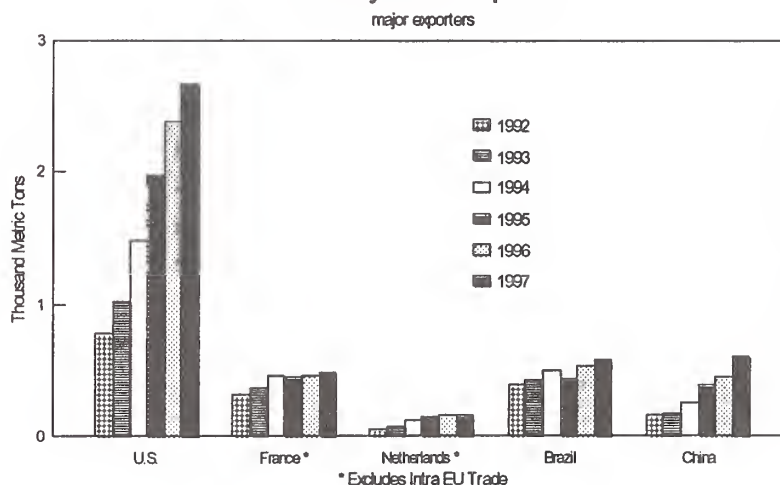
U.S. Pork Imports



Surge In Poultry Meat Exports To Continue

The United States is the world's largest exporter of poultry meat. During the 1990-92 period, U.S. exports were not much larger than those of a few other countries. But, the strong growth in U.S. exports during the 1990's propelled the United States far out in front of competitors. The EU countries offered large subsidies on their poultry meat exports, but they have had to cut back on these subsidies under the WTO rules. This will limit growth in exports by EU countries. (Data in the chart exclude intra EU trade for France and Netherlands). Brazil and China, however, are sharply expanding exports.

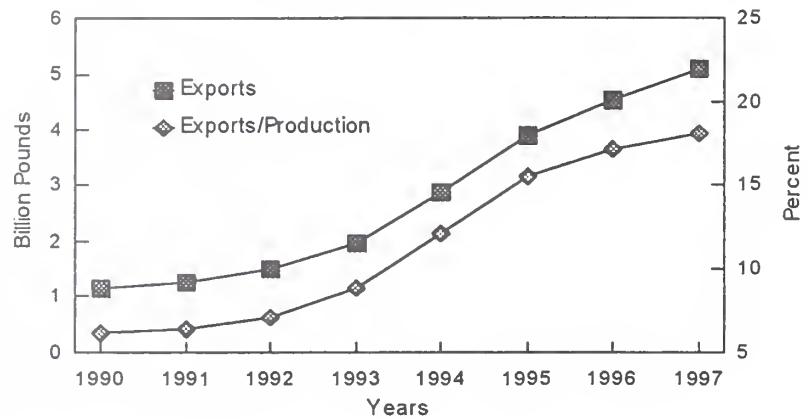
Poultry Meat Exports



U.S. broiler exports have been on a strong upward swing. Exports are largely dark meat products, lower priced parts of the bird with a weaker preference than breast meat among domestic consumers. Exports in 1996 were up 16 percent from a year earlier and nearly 300 percent above the 1990 level. Exports are projected to increase again in 1997 and long-term prospects point to continued increases. In 1996, exports were equal to over 17 percent of domestic production compared with around 6 percent in 1990.

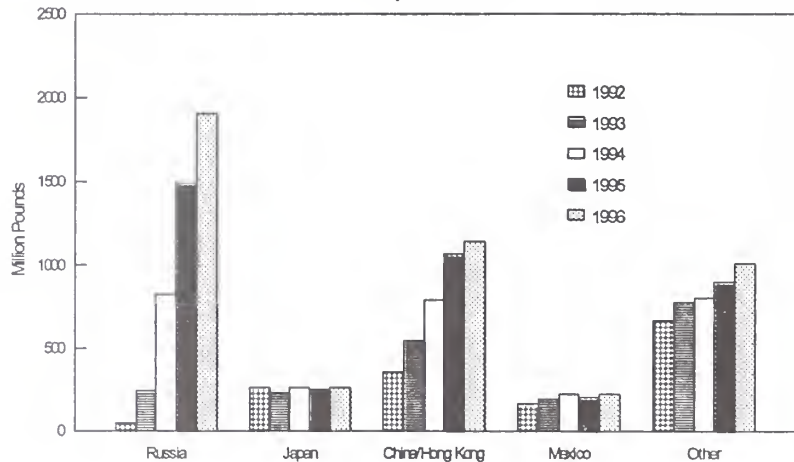
In the 1980's, Japan was the primary market for U.S. broiler exports. Hong Kong/China (a large share of the imports by Hong Kong are transhipped to China) was emerging as a larger market and surpassed the volume going to Japan in the early 1990's. Then in 1994, exports to Russia soared and became the number one foreign market for U.S. broilers. Russia continues to be the largest market and in 1996 about 42 percent of the total broiler exports went to Russia. Broiler production in Russia has been declining and another decline in production is likely this year. In fact, it will be at least a few more years before any significant increase in broiler production in Russia can be expected. However, the U.S. broiler industry proposes to invest several million dollars in Russia to modernize a model complex to provide an example of how companies in the United States produce broilers. Exports to Russia are primarily leg quarters, a relatively inexpensive source of protein for them, and U.S. supplies are expected to remain plentiful. This combination should result in continued high levels of exports to Russia the next few years. But, a lot of uncertainty about the size of this market remains because of the potential imposition of food quotas.

Broiler Exports and Exports as a % of Production



U.S. Broiler Exports

major destinations



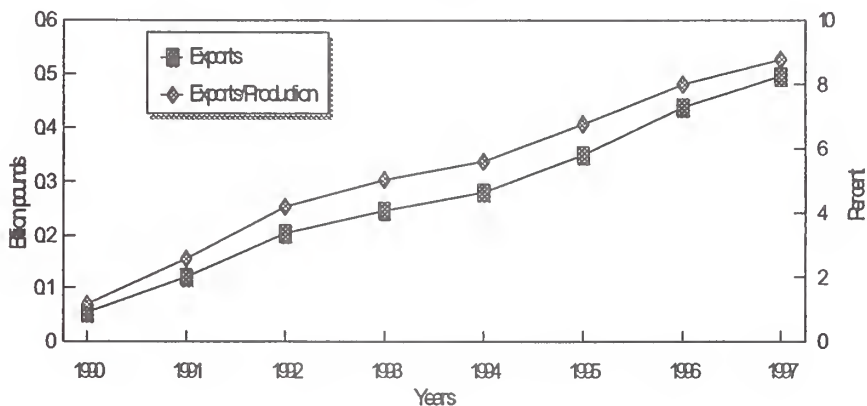
Strong growth in demand in Hong Kong/China is expected to support further increases in exports to them. Broiler production in China has been on a strong upward trend, but the growth in demand has exceeded the production increases. From a very low base, per capita consumption in China is rapidly increasing, but it remains at a relatively low 4.5 kg.

Broiler exports to many other countries, while small in comparison to Russia, Japan and Hong Kong/China, have been showing large increases. In general, there is a growing demand for broiler meat around the world. Per capita consumption is on the up tick in many countries. While production in most countries around the world is on an upward trend, output in many countries is not keeping pace with demand. This will support the anticipated growth in total U.S. broiler exports.

The growth in exports of products from the mature chickens slaughtered in the United States is nothing short of phenomenal. Exports in 1996 increased about 170 percent from the year-earlier level, and they were over 10 times the level of exports in 1990. Granted the base from which they started is low, but exports in 1996 were equal to about 55 percent of production. Another increase in exports is forecast for 1997.

Turkey exports have also increased sharply. In 1996, exports were up about 25 percent from the year-earlier level and were equal to about 8 percent of production. The 1996 exports were up over 700 percent from the 1990 level when exports were equal to only around 1 percent of production. Turkey exports are expected to increase again this year.

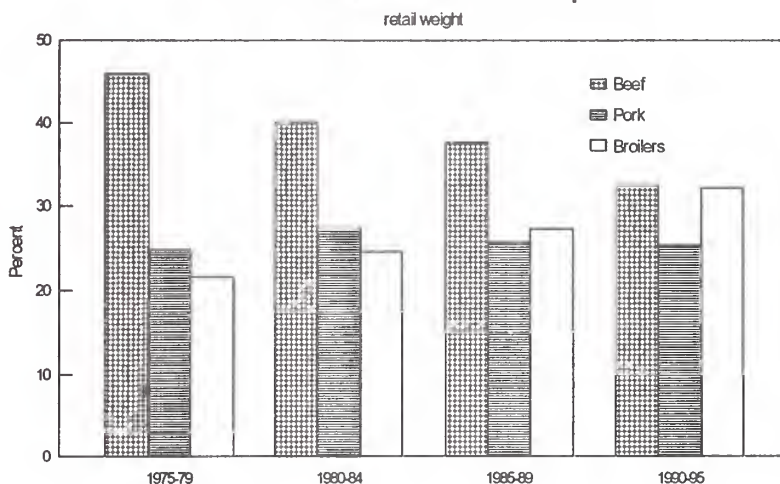
**Turkey Exports and
Exports as a % of Production**



PER CAPITA DOMESTIC CONSUMPTION (DISAPPEARANCE)

Market shares claimed by the various meats continue to shift. Looking at 5 year averages from the mid 1970s to the mid 1990s gives a view of these shifts. During 1975-79, beef claimed over 45 percent of the market. This share slipped to just under one third in the 1990-95 period. Pork's share of the market has remained around the one fourth level. Broilers, however, have claimed a larger share, increasing from just over 20 percent during 1975-79 to almost a third during 1990-95. Last year, market shares stood at 32, 24, and 34 percent for beef, pork, and broilers, respectively.

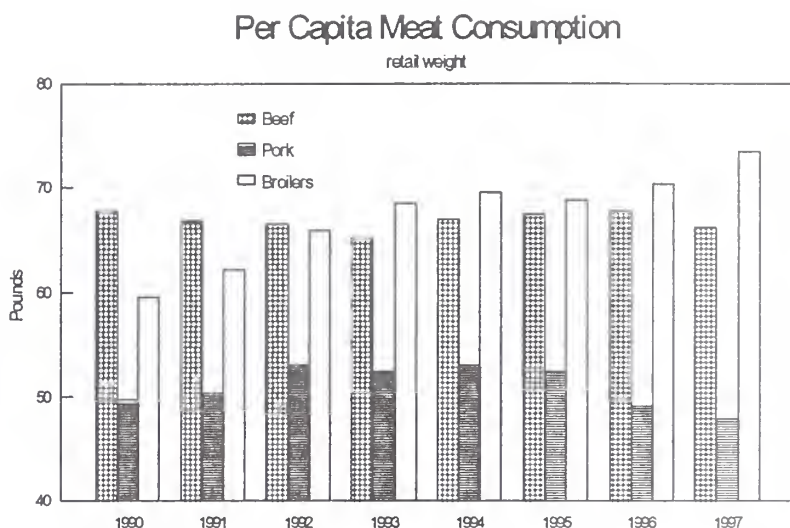
Share of Total Meat Consumption



On a retail weight basis, per capita consumption of all meats combined slipped slightly in 1995, but by historical standards it was still at a high level. This was the first decline since 1990 when per capita consumption slipped about 0.3 percent. Per capita consumption slipped further in 1996 when pork dropped about 6 percent. A slight rebound in per capita consumption of all meats combined is forecast for 1997 with gains in poultry more than offsetting a decline in red meats.

Per capita beef consumption in 1996 was little changed from the 1995 level. This year, per capita consumption will decline as beef production begins to slip and exports continue to increase. In 1998, the decline in per capita consumption will be even more pronounced when production drops sharply and exports increase. The continued growth in exports combined with lower beef output will reduce supplies available in the domestic market resulting in lower per capita beef consumption.

Per capita pork consumption dropped sharply in 1996 as producers curtailed production and exports increased. A further decline in per capita consumption is expected this year as production changes little from the 1996 level, and exports continue to grow. Unlike beef, however, 1998 should be a year of increased per capita consumption as pork production rapidly increases.



Despite the torrid pace of exports, broiler output continues to rise at a pace that supports increases in domestic per capita consumption. In 1996, per capita consumption (retail weight basis) exceeded 70 pounds, up almost 2 pounds from the 1995 level. Another increase is forecast for 1997 when about 3 pounds could be added to last year's total. Broiler producers are likely to look to the void that will be created in 1998 and 1999 when beef supplies drop and increase production sharply, resulting in further gains in per capita consumption and capturing a larger share of the meat market.

PRICES

Prospects are good that livestock and poultry prices in 1997 will be at relatively favorable levels for producers. Increased exports will be supportive of prices this year. Also supportive of prices will be a continued favorable economic situation. In 1996, real GDP increased nearly 2.5 percent and a similar increase is forecast for 1997.

Higher Cattle Prices On The Way

The price for Choice fed steers on the Nebraska Direct market in 1996 averaged about a dollar per cwt below the 1995 level, the lowest annual average since the mid 1980's. Prices were highest in the second half of 1996 when supplies of grain-fed cattle dropped sharply because of the high feed costs that sharply reduced feedlot placements in the spring. Fed cattle prices will remain under the pressure of large supplies of fed cattle coming from feedlots this winter and into the spring. But, as we move into the second half of 1997, feedlot supplies are expected to tighten and support a recovery in fed cattle prices. Prices will continue to move higher in 1998 when beef supplies shrink. The magnitude of the increase will depend on several factors. Among these are changes in the availability of competing meat supplies, the strength of foreign and domestic beef demand, and the demand for the types and qualities of beef

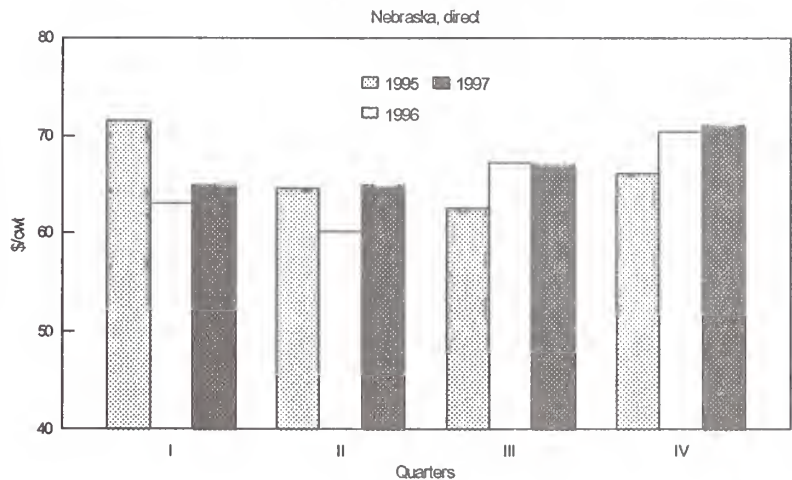
that are available to various groups of users. For example, will a strong export demand for high quality beef leave the domestic market with tight supplies of Choice grade beef.

Feeder cattle prices are recovering from the very low levels to which they sank in 1996. Prices were already under the pressure of large feeder cattle supplies in 1995, and when the 1995 corn harvest turned out to be poor, this put even more pressure on prices. Cattle feeders entered 1996 with large supplies of cattle in feedlots and fed cattle prices that were sinking under the pressure of the large supplies. This combination of sinking fed cattle prices and rising corn prices put cattle feeders in the position of offering very low prices for replacement cattle for their feedlots. Further compounding the problem was drought in some areas and a sharp reduction in available forage supplies. The result was a very sharp drop in feeder cattle prices in the first half of 1996.

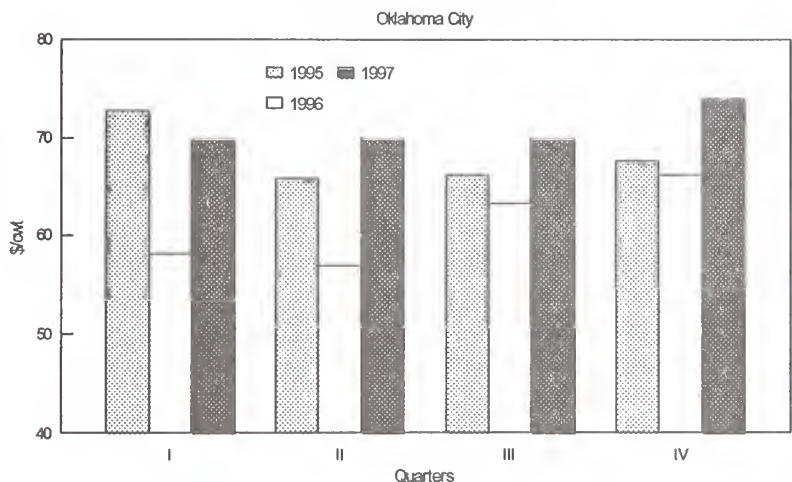
As fed cattle prices started to recover in the second half of 1996, feeder cattle prices also showed improvement despite the record high corn prices during the summer. As prospects for a good corn harvest in 1996 materialized, this added support to feeder cattle prices. For all of 1996, prices for 750-800 pound Medium #1 feeder steers at Oklahoma City averaged about \$61 per cwt, about \$7 below the previous year and more than \$16 below the 1994 average.

Feeder cattle supplies will tighten as we go through 1997 helping to boost feeder cattle prices. Lower corn prices in 1997, combined with higher fed cattle prices, will also help support an increase in feeder cattle prices. A 1997 average in the low \$70 per cwt range now seems likely. Grazing conditions this spring and summer, and the size of this year's hay crop will have a big impact on feeder cattle prices. Dwindling feeder cattle supplies in 1998 should lend further support to another increase in prices in 1998, but again feed supplies and prices will be critical in determining the exact level of prices. With favorable feed supplies at reasonable prices, producers should see relatively favorable feeder cattle prices for the next several years.

Choice Steer Prices



Feeder Steer Prices

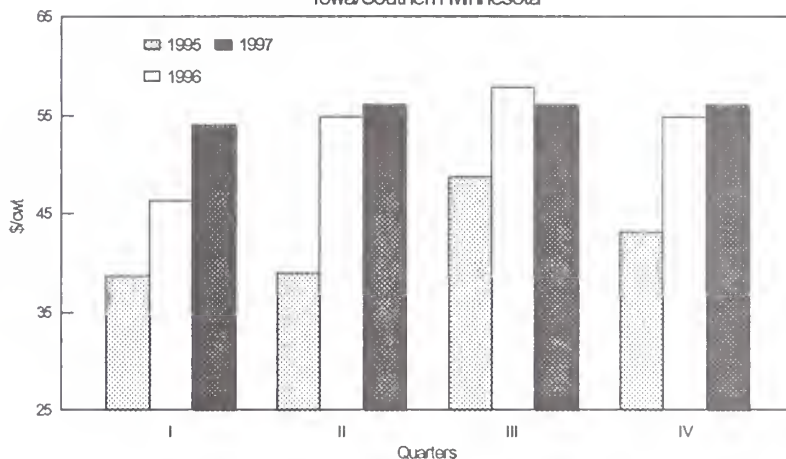


Hog Prices To Remain Strong This Year, Weaken Next Year

Hog prices in 1996 rose sharply from the 1995 level, particularly during the spring. Supporting the sharp increases in prices last spring was a large decline in pork production. The decline was larger than most anticipated and caught many users with short supplies. Exports at that time were also moving at a very fast pace, helping boost prices. Spring quarter exports rose 61 percent above the relatively high level of the previous year. Another factor lending support to prices in 1996, was a strong demand for bacon by the fast food industry. This demand largely stemmed from the featuring of bacon/burgers by many of the fast food chains. The annual average price for 230-250 pound barrows and gilts in the Iowa/Southern Minnesota market during 1996 was about \$53 per cwt, about \$11 above the 1995 average. In 1997, prices are forecast to average a couple of dollars above the 1996 average. A sharp drop in prices is likely in 1998 when production increases, and prices for the following year will also be under the pressure of large supplies. A supporting factor for prices in 1998 and 1999 will be a lot less competition from beef, but it remains to be seen just how much this might be offset by increased poultry output.

Barrow and Gilt Prices

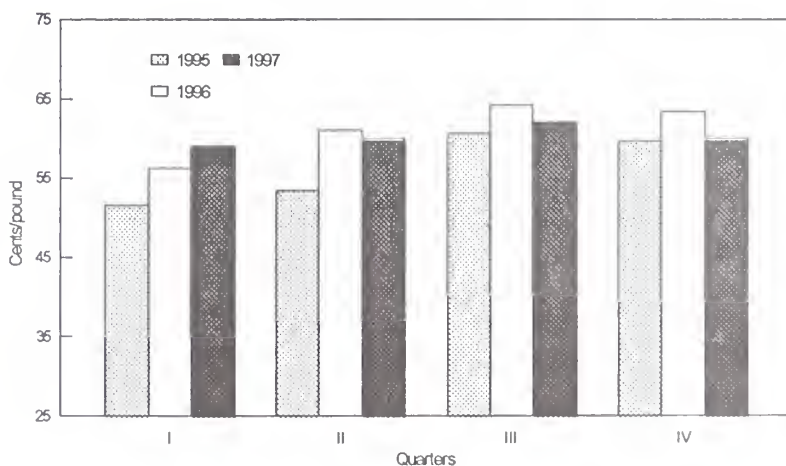
Iowa/Southern Minnesota



Strong Broiler Prices Likely To Continue

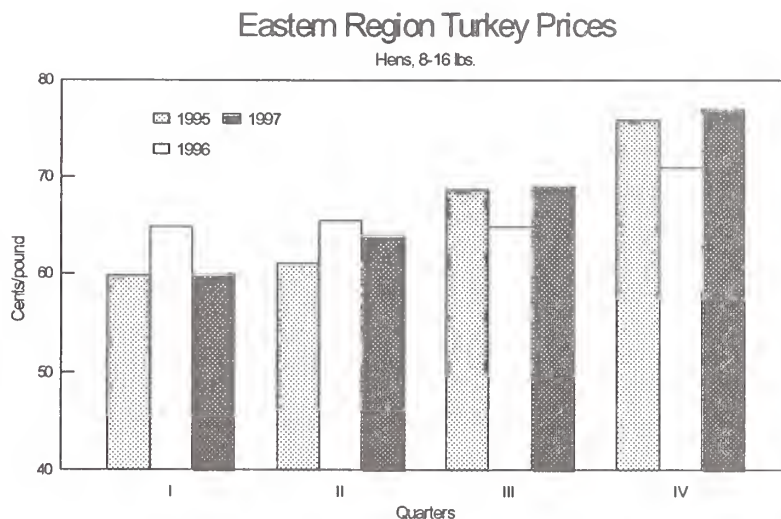
Even though broiler production increased over 5 percent in 1996 and per capita consumption rose around 2 pounds, the 12 city broiler price registered about a 5 cent per pound increase from the 1995 average. Prices are expected to continue at a relatively high level this year, even as production increases again. Lower pork production will be a supportive factor for broiler prices this year. The 1997 annual average, however, is expected to slip about 1 cent from 1996's average of 61.2 cents. Broiler prices in 1998 and 1999 likely will slip from the 1997 level as broilers find their niche between falling beef supplies and rising pork output.

12 City Broiler Prices



Turkey Prices To Rebound

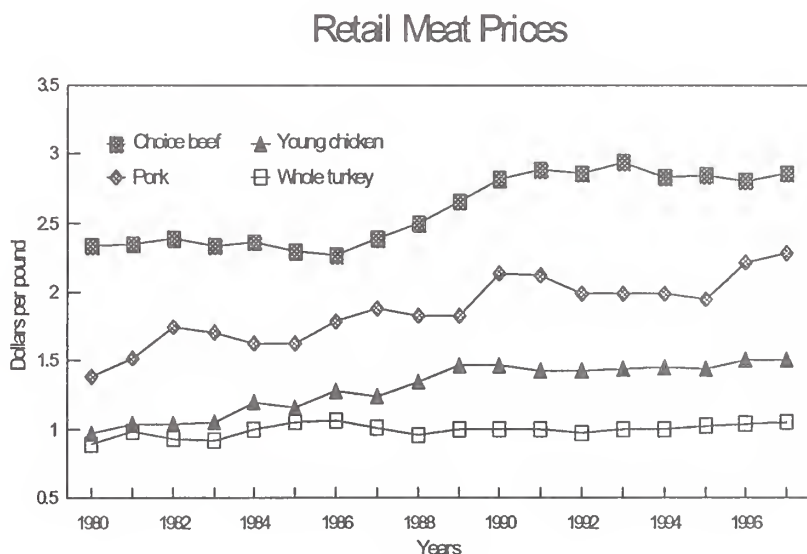
Turkey prices in 1996 averaged about the same as in 1995 and only slightly above the 1994 level. The largest year-over-year increases in output since 1990 kept prices under pressure last year. Early 1997 prices are down from a year ago, but stronger prices are expected in the second half of 1997. Lower pork production and higher pork prices in the fall will be supportive of higher turkey prices. In 1997, turkey prices are forecast to average slightly above the 1996 level.



Slightly Higher Retail Meat Prices In 1997

Retail meat prices have risen only modestly since 1990. In 1996, retail prices for Choice beef were slightly below the 1990 level, pork prices were up 4 percent, broiler prices were up 3 percent, and turkey prices were up 5 percent. The last significant increase in retail meat prices was 1990 when per capita supplies of both beef and pork declined, beef was down about 2 percent, and pork was down about 4 percent. The availability of relatively large domestic meat supplies in 1996 helped hold down the rise in overall retail meat prices from the 1995 level. Retail beef prices in 1996 were slightly lower than the previous year. Reduced pork output, however, sparked a sharp rise in pork prices and strong demand helped boost broiler prices.

For much of 1996, Choice grade beef was in relatively tight supply despite an increase in overall beef output. This helped hold up the retail price for Choice grade beef which is what is used in USDA's retail price spread series. The farm-to-retail spread for Choice grade beef in 1996 was slightly below the 1995 average. The spread may narrow a little in 1997 as beef supplies tighten and increases in retail prices lag gains in fed cattle prices. Retail prices for Choice grade beef are forecast to rise 1 to 2 percent in 1997. The upward pressure on retail prices will be more pronounced in 1998 when domestic beef supplies tighten substantially.



Retail pork prices rose sharply in 1996, the first significant increase since 1990. The retail price increase was supported by the reduction in pork output, but the strong export market and demand by the fast food industry also

meant less product on supermarket shelves and helped boost prices. The farm-to-retail price spread widened in 1996. The uncertainty over available supplies for supermarkets and their reluctance to feature pork at times probably contributed to this increase in the spread. Another increase in retail prices, perhaps in the 3 to 4 percent range, is in prospect for 1997. The farm-to-retail spread probably will remain relatively wide until production shows greater signs of expansion and retailers can make longer term plans for featuring. Exports patterns in 1997 will once again be unstable because of the Japanese SG mechanism. This will contribute to uncertainty about domestic availability of pork during periods when exports surge to beat the imposition of the SG. In 1998 and 1999, retail pork prices should be lower.

The young chicken composite retail price increased nearly 5 percent in 1996. Prices increased even as domestic per capita consumption of broilers rose about 2 pounds. Tight pork supplies at higher prices and a sharp increase in exports of the lower valued cuts of chicken helped support the rise in retail prices. This year, retail prices likely will show little change from the 1996 level. The retail price of whole turkeys increased about 2 percent in 1996, but this year they are expected to remain near the year-earlier level.

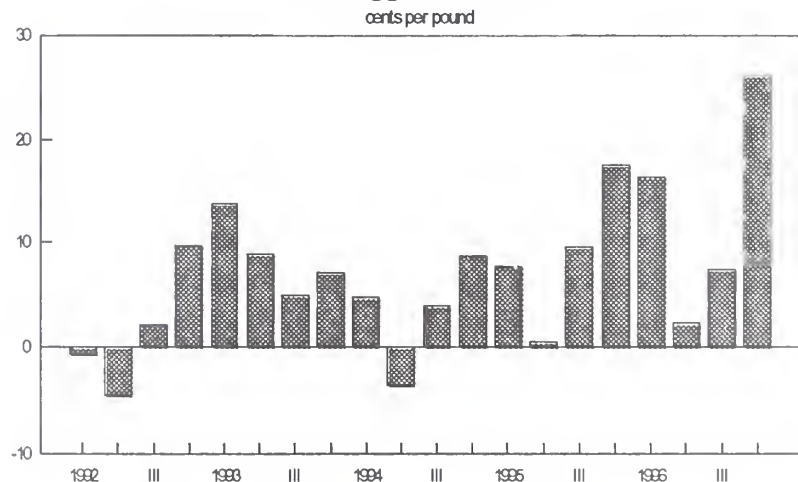
EGGS

Egg producers have enjoyed a profitable period during the last few years. Even though feed costs rose sharply in 1996, egg prices increased to levels that left producers in a profitable situation. The magnitude and the duration of the period of profits is almost unheard for the egg industry. Returns probably will be good again in 1997.

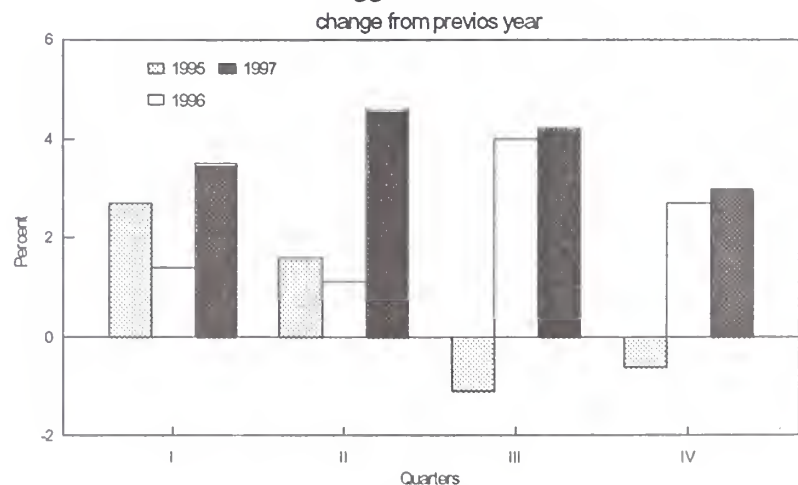
Further Increases In Production Likely

Egg production increased over 2 percent last year. The laying flock in 1996 averaged more than 1 percent larger than in 1995, and the number of eggs per layer increased nearly 1 percent. Egg production probably will increase again in 1997 as the profits that producers saw probably will prompt them to continue to expand output. On January 1, 1997, the laying flock was 2 percent larger than a year earlier, and the rate of lay on January 1 was up 1 percent. A 3 to 4 percent increase in egg production is likely for 1997.

U.S. Egg Net Returns



Egg Production

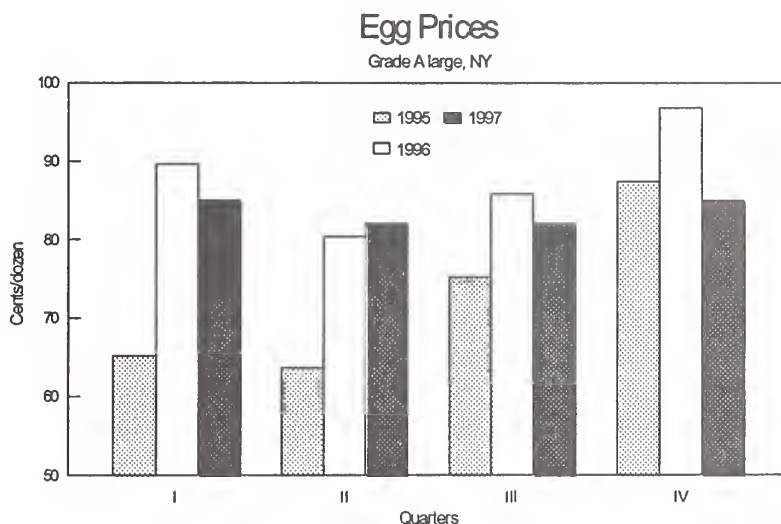


Egg Exports Increasing

The export market for eggs, like that for other poultry products, has been strong. Exports were up nearly a fourth in 1996, following strong increases in 1994 and 1995. Larger shipments of egg products were the chief factor in this strong increase as shipments of shell eggs rose only 6 percent. Foreign demand for egg products has been especially strong. Japan is the primary market for the egg products. The majority of the increase in egg product exports came from larger shipments to Mexico, Canada, and Japan. Together these 3 countries accounted for 88 percent of all egg product exports. Exports of egg products to Mexico increased the most, up 134 percent from the previous year. This is the sixth year in a row that exports of egg products to Mexico increased, from 2 million dozen in 1990 to an estimated 35 million in 1996. During 1996, almost all the increase came from increasing exports of dried egg albumen for use in prepared food products. Shell egg exports to Hong Kong have also been strong. Further increases in egg exports are expected in 1997.

Prices To Slip From The Highs In 1996

The Grade A large egg price on the New York market averaged over 88 cents per dozen in 1996, up about 15 cents from the 1995 level. Prices averaged over a dollar a dozen during November and December with a fourth quarter average of 96.7 cents. Strong domestic and foreign demand helped boost prices. Shell egg movement through retail outlets has been strong and per capita consumption of shell eggs in the United States increased fractionally last year, the first increase since 1979.



The increasing trend in eating breakfast away from home probably contributed to the increase in both egg product and shell egg consumption. Studies have shown that away from home breakfasts increased 24 percent between 1989 and 1993. They also show that the egg content of breakfasts eaten away from home is much higher than breakfasts eaten at home. Furthermore, the American Egg Board reports that a 1995 survey showed 12 percent of food service operators increasing egg use at lunch and 6 percent increasing use at dinner.

Prices remain at relatively high levels in early 1997, but weaker prices are in prospect later this year due to strong growth in production. For all of 1997, prices probably will average about 5 cents per dozen below the 1996 level.

Retail egg prices rose sharply last year, up nearly 20 percent. The sharp increase in output that is expected this year will push retail prices lower.

Order these Timely New Publications on Agriculture's Future

Quantity	Title	Amount
_____	Long-term Agricultural Projections to 2005 Stock #WAOB-97-1 \$12	_____
_____	Outlook Forum '97 Proceedings All submitted speeches and charts presented at the Forum. Due off press in April 1997. Stock# YCON-97 \$20	_____
_____	Buy Both Reports and Save! Due off press in April 1997. Stock# Package-WAOB-97 \$30	_____

Add 25% for non-U.S. address (includes Canada)

Total order amount _____

Check for \$_____ payable to ERS-NASS enclosed. Use purchase order, check drawn on U.S. bank, cashier's check or international money order.

Credit Card order ☐ MasterCard ☐ Visa

Card Number _____

Expiration Date _____

Signature _____

For fastest service, call toll free, 1 (800) 999-6779

Name _____

Address _____

City _____

State _____ Zip _____

Daytime Phone _____

Mail to:

ERS-NASS

341 Victory Lane, Herndon, VA 22070

Fax to: (703) 834-0110



**February 24 and 25, 1997
Washington, D.C.**